DECEMBER 19, 1955

STEEL
The Metalworking Weekly

APPLIANCES

Sales of major units next year will jump 10 per cent over 1955 levels

—page 48

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Here Is Extra Motor Value

Double-shielded bearing
Large grease reservoirs
Bolted-on bearing cap
Labyrinth seals

This Allis-Chalmers Bearing Design Gives More for Your Motor Dollar

You can lubricate these bearings without dismantling motor. Pipe-tapped holes in the bearing housings at two points provide means for inserting new grease, flushing out old grease and relieving pressure during re-greasing.

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B6210.

A-4617

ALLIS-CHALMERS

XIII

This is the thirteenth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Manganese in Alloy Steels

A common and economical alloying agent, manganese is both highly respected and highly essential. It is one of the most basic elements in alloy and carbon steels; in fact, all analyses contain manganese to some extent. Whenever the content exceeds 1.65 pct, manganese steels are classed as alloy steels.

Manganese is one of the energetic deoxidizers, and has less tendency to segregate within the ingot than most other common elements. It is quite beneficial to surface quality in all carbon ranges and minimizes "red shortness" or susceptibility to tearing and cracking at rolling temperatures.

Manganese contributes markedly to strength and hardness, but to a lesser degree than carbon. Actually, the effectiveness of manganese in this respect depends largely upon the carbon content, for higher-carbon steels are more affected by manganese than are the lower-carbon steels.

Another function of manganese is to decrease the minimum—or critical—cooling rate. In this connection it enhances the hardenability. As might be expected, high manganese content with increasing carbon has a tendency to lower ductility and weldability.

Fine-grained manganese steels attain unusual toughness and strength. Such steels are often used in the making of gears, spline shafts, automobile axles, steam valves, rifle barrels, cylinders for compressed gas, and many other products. With a moderate amount of vanadium added, manganese alloy steels are also used for forgings too large to be liquid-quenched properly.

As mentioned earlier, manganese is one of the most fundamental constituents of steel. If you would care to know more about its properties, applications, and effects in alloy combinations, Bethlehem technicians will be glad to work closely with you. The same holds true, of course, when your problem involves other elements of alloy steel.

And when you require new supplies of steel, remember that Bethlehem manufactures the entire range of AISI standard alloy grades, as well as special-analysis steels and all carbon grades. You can place complete confidence in their quality.

If you would like to have a reprint of this advertisement, or of the entire series from I through XIII, please write to us, addressing your request to Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

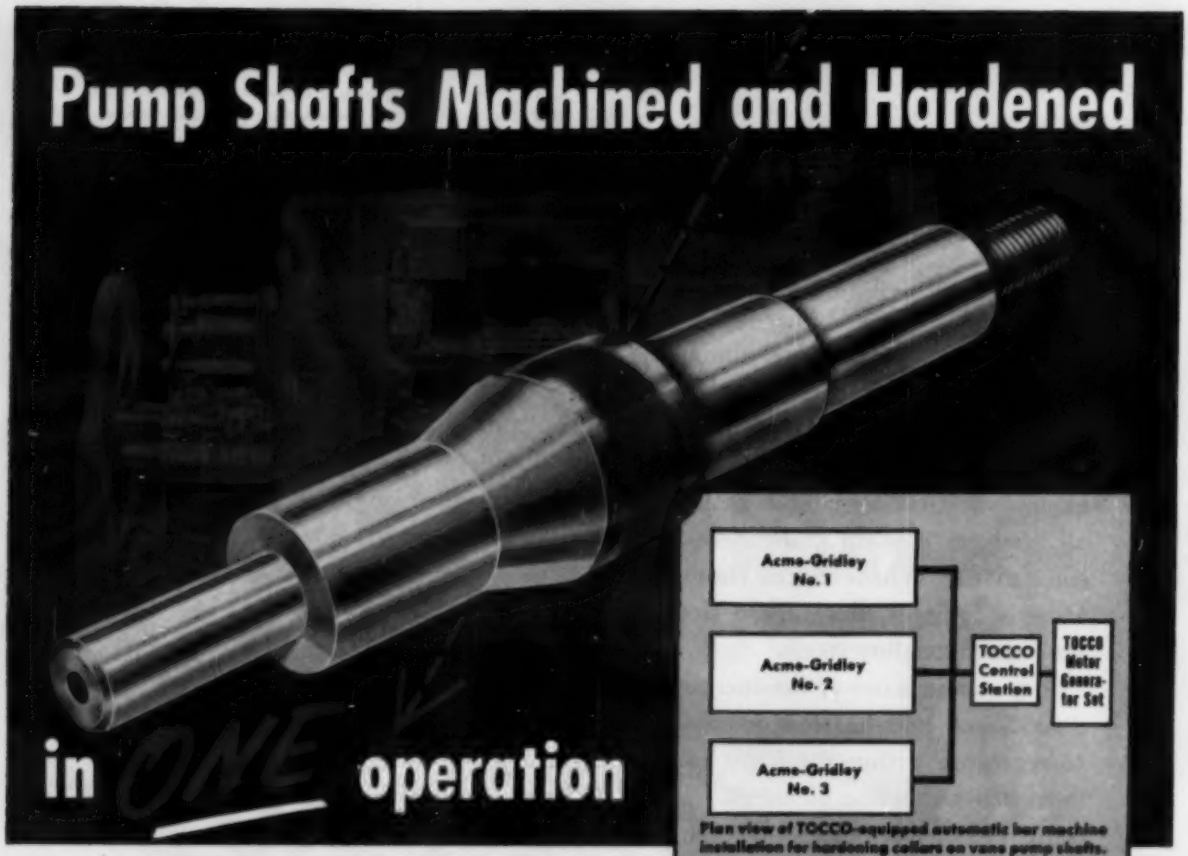
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Pump Shafts Machined and Hardened



Plan view of TOCCO-equipped automatic bar machine installation for hardening collars on vane pump shafts.

with TOCCO* Induction Heating

TOCCO-equipped 8-spindle Acme-Gridley Bar Automatics at a large automotive manufacturer's plant produce vane pump shafts for power steering units in one completely automatic operation!* No handling—no hardening cost except power!

A TOCCO inductor, mounted at one station of each automatic, hardens collars on pump shafts after they have been completely machined at preceding stations on the same machine. Each installation consists of 3 automatic machines equipped with inductor coils powered by a 50 KW, 10,000 cycle TOCCO unit. Production from each installation is 360 shafts per hour.

Shafts are made of C 1144 and only the collar is hardened to prevent scoring the seal. TOCCO's rapid heating confines the hardened area to the surface of the collar leaving the rest of the shaft unaffected.

If your products or their components require heat treating, soldering, brazing or heating for forging, it will pay you to investigate TOCCO for better, faster production at lower unit costs.

*A Patented Process

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-12, Cleveland 1, Ohio
Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating."

Name_____
Position_____
Company_____
Address_____
City_____ Zone____ State____

Traveloader... revolutionizes long load handling!

Here at last is a practical answer to the awkward problems of yard handling and particularly those nightmarish long loads. Traveloader combines the unique ability to pick up, carry and stack long, unwieldy or multiple pallet loads —indoors or out. Operating over paved or unpaved roadways, it does the job fast, safely, and much cheaper than other equipment.

This one machine, with one operator, replaces two and often three fork trucks, portable cranes or straddle carriers, and does the job better. You save manpower, cost of buying and maintaining other expensive equipment, aisle space, and time. Because Traveloader loads from the side and carries loads lengthwise, it requires much less aisle space than fork trucks.

Unlike a straddle carrier, this new machine can stack up to 12 feet high. And when traveling, the load is nested safely aboard the Traveloader's deck, eliminating dangerous dangling and swaying of load, distributing load evenly over four large wheels, and making speeds up to 30 MPH practical and safe.

Write for descriptive bulletin No. 1360.

ONLY TRAVELOADER

Picks up like a *straddle truck* • Delivers like a *highway truck* • Stacks like a *fork truck*

Baker®
handling equipment

THE BAKER-RAULANG COMPANY
1259 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

ST4

Just press the easy-acting lever on this Quick-Reset Ratchet Counter . . . *and all 4 figures reset to zero as instantly as though you used a push-button.* This saves time and speeds work on short machine runs, inspection and many other jobs. Counter is compact . . . 2.69" long, 1.44" high, 1.29" wide. The 4 white-on-black figures are .166" high. You can order it (Series 1126) from stock right now . . . just like scores of other Veeder-Root Counters for manual, mechanical and electrical operation in every field from electronics to atomics.

VEEDER-ROOT INCORPORATED
HARTFORD 2, CONNECTICUT
Greenville, S. C. • Chicago 6, Ill.
New York 19, N. Y. • Montreal 2, Canada
Offices and Agents in Principal Cities

EVERYONE CAN COUNT ON
VEEDER-ROOT
"THE NAME THAT COUNTS"

STEEL
The Metalworking Weekly

DECEMBER 19, 1955
Vol. 137 No. 25

Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscription in the United States and its possessions, Canada, Mexico, Cuba, Central and South America, $10.00 a year; all other countries, $20.00 a year. Single copies (current issues), 50 cents. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland.

behind the scenes

Meet New Editor

STEEL's newest assistant editor, Ross Whitehead, two months ago moved to the desk assigned to him in the technical section, and fell upon his typewriter like a man possessed. This was not particularly unusual, because Ross *is* possessed of a remarkably impressive technical experience. Moreover, when he beats the ever lovin' stuffings out of his typewriter, he merely does what comes naturally: An aptitude test to which he was exposed at the Ford Motor Co. exposed him as a writer instead of a trouble shooter, and before he could say "statistical quality control analyst" three times, that's precisely what he became.

In the course of a long and possibly misspent life we had interviewed a California sea lion, a snake-entwined lady, a Sonora bandit, an Eskimo in mufti and a sea captain who named his ship after a pet cow, but up until this year we had never faced a statistical quality control analyst. The interview went something like this:

"Mr. Whitehead, how does a statistical quality control analyst go about his business?"

"Well, it isn't easy."

And there you are.

Hold That Sunshine

Ross' interests are as wide as his industrial experience, which is considerable. Right now he is fascinated by the subject of solar energy. "It says right here in this magazine," he said, pointing to *Research & Engineering*, a new publication published monthly by the Relyea Publishing Corp., "that the sun daily showers the world with several thousand times more energy than man uses. How about that? The sun pours a hundred times more energy on your house than it gets through electric power wires!"

"Than the sun gets through wires?"

"No, no; than the house gets. What do you suppose we are going to do when all the coal and oil and gas and fissionable materials in the world are used up, hey? We're going to harness the sun; that's what we're going to do. We're going to trap solar photons impinging on earth surface molecules, and this solar energy . . ."

What are you going to do with a guy who flutters about in the fourth dimension of engineering? His wife, Virginia, and his children, Bob, 16, and Cherie, 10, probably have to watch him when he's out in the sun.

Free Offer Lags

In 1943 The Penton Publishing Co., publishers of STEEL, suspended a daily called the *Daily Metal Trade*. In a way it was a war casualty. Anyway, before it went under, with its flag still flying, the circulation department sent out a postal card mailing calling attention to its free sample copy offer. Mailed early in January, 1943, the cards went to all parts of the country. One, addressed to H. H. Scudder & Co., Ellsworth and Lyon Ave., Marshall, Mo., was held for attention. Finally, early on the morning of Nov. 14, 1955, the H. H. Scudder Co. made up its mind. It agreed to accept a free sample copy of *Daily Metal Trade*, and returned the postal card as a mute witness to its intention.

This definitely puts the Penton people up a tree. It puts them in the position of promising something they can't deliver. The only thing that cheers them is their knowledge of Mr. Scudder's patience: It isn't likely that he will complain before 1967.

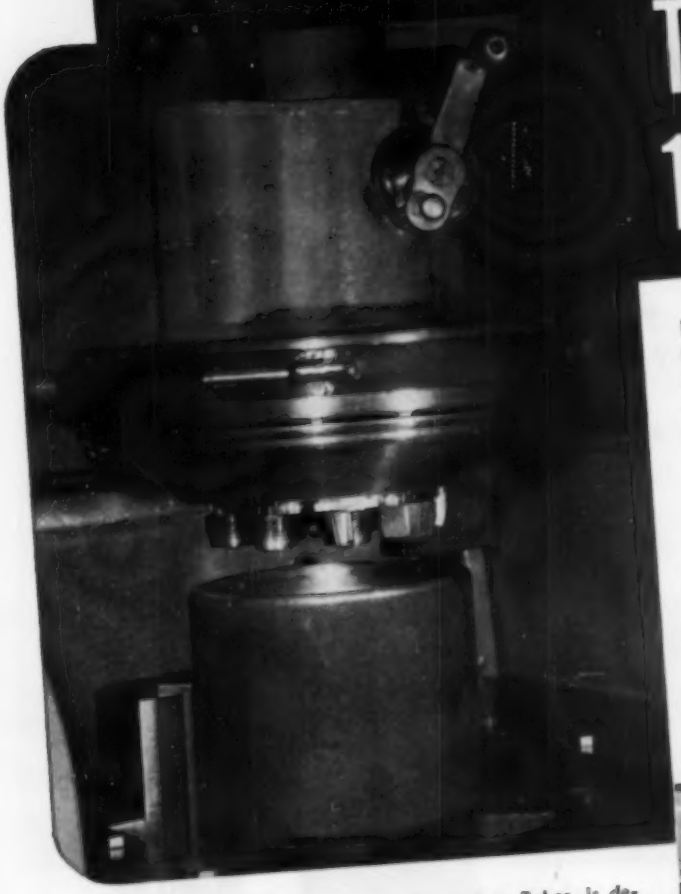
Cannibal's Years

Three extremely literate young cannibals were discussing their respective ages. Mbingo, it appeared, was as old as Mbango and Mbongo together. Last year, however, Mbango looked at his watch and was delighted to observe that he was twice as old as Mbongo. But two years from now, Mbango pointed out, Mbingo will be twice as old as Mbongo. How old is Mbingo? Mbango? Mbongo?

Shrdlu

(Metalworking Outlook—Page 41)

LARGE CASING THREADS TAPPED IN 12 MINUTES



BAKER OIL TOOLS, INC., of Los Angeles, California, reports that a **LANDIS** CBLM Circular Chaser Tap mounted on a Stamet's vertical tapping machine has reduced threading time 75% tapping 6⅝" to 13⅜" diameter threads in casing shoes.

Production examples illustrate the large savings made in threading time: (1) tapping 13⅜" N-80 tubular stock, oil well casing shoe with 8 Pitch API round threads 5" long requires but 12 minutes; (2) tapping a 6⅝" piece with an 8 pitch API round thread 5" long takes only 8 minutes. Formerly threading a typical casing shoe would have required all of 40 minutes.

The **LANDIS** CBLM Tap, as used at Baker, is designed for use on production tapping machines to thread line pipe, casing, and drill pipe couplings. The tap head is detachable, and with the use of the various size tap heads available, the CBLM Tap will tap threads ranging from 4½" to 13⅜" O.D. It will cut either 3/16", ⅜", or ¾" tapered threads well within all API Standards, and can also be arranged for straight threading. Infinite taper adjustments are possible either above or below the required degree of taper to assure precision accuracy.

LANDIS manufactures a wide variety of taps for the economical production of internal threads ranging from 1¼" to 13⅜", either straight or tapered threads, on both stationary and rotating spindle machines. To ensure complete information, please enclose specifications when writing.

LANDIS *Machine* CO. WAYNESBORO, PENNSYLVANIA, U.S.A.

979-9

Wire rope lasts as long as the wire it's made of!

ROEBLING'S NEW ROPE WIRE

1105

HAS THE CAPACITY TO ENDURE...
AND

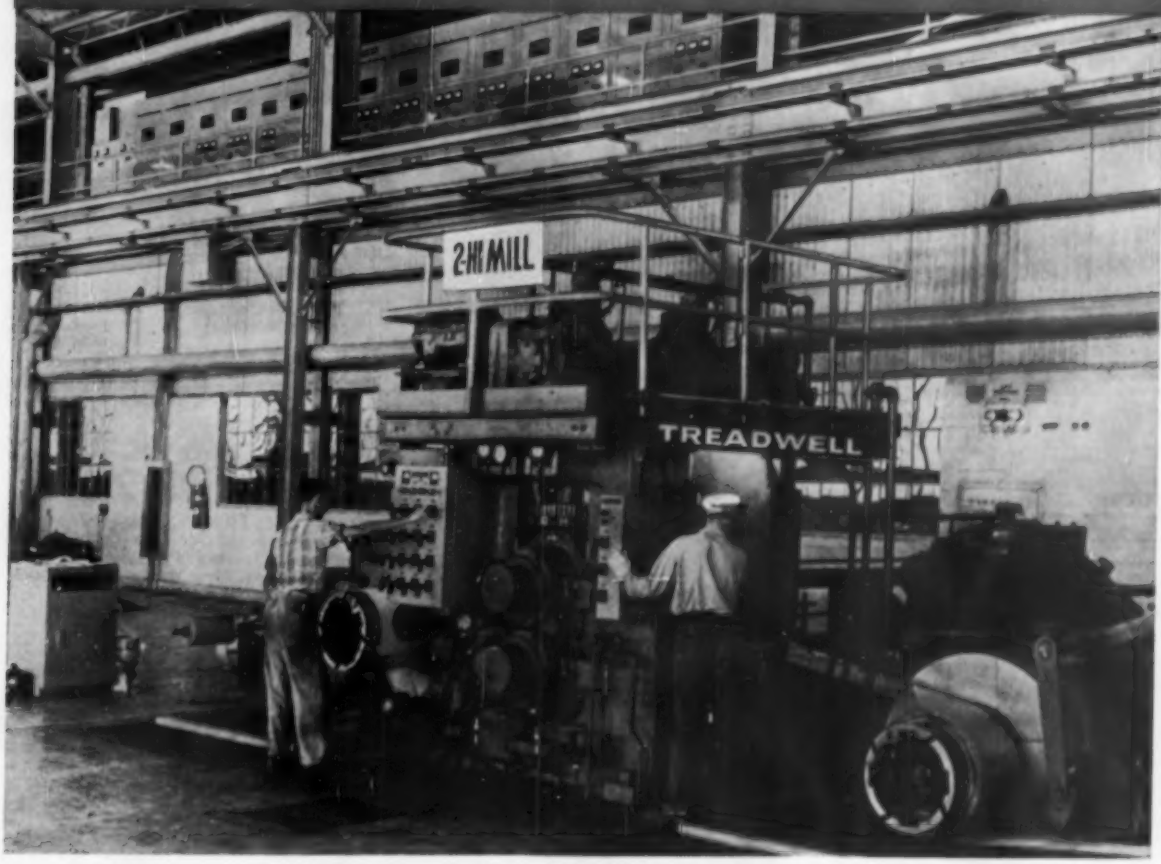
Royal Blue

WIRE ROPE
IS MADE OF 1105!

Write us for full facts on the all-steel Royal Blue Wire Rope, or contact your Roebling distributor

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 918 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1930 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

Treadwell



Temper or skin pass and cold rolling mills for high carbon, stainless and carbon steel strip complete with coiling equipment.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging

Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.

Beds, Cooling
Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
Handling Equipment (Kick-offs, Pilers, Cradles, etc.)
Steel and Iron Castings
Ni-Hard and Ductile Iron Castings

BETTER GRADE MACHINERY

Treadwell Engineering Company

EASTON, PA.

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208 S. LA SALLE STREET
CHICAGO 4, ILL.
CEntral 6-9784

140 CEDAR STREET
NEW YORK 6, N. Y.
WOrth 4-3344

1015 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
ATlantic 1-2883

LETTERS
TO THE EDITORS

Equipment Leasing Hit

May we have a reprint of the article, "Blow to Equipment Leasing" (Nov. 21, page 52)?

Please advise if we have your permission to reprint this article for distribution to our field sales organization.

C. L. Helms
Manager-Marketing Administration and Advertising
Welding Department
General Electric Co.
York, Pa.

• *Permission granted.*

Mesabi Range Ore Reserves

We are attempting to find some official or semiofficial estimate of the high grade ore reserves remaining in the Mesabi Range, especially estimates ranging anywhere from 10 to 25 years.

Since we are aware of the high esteem in which your publication is held, we would be grateful if you could furnish us with a reasonable estimate of the Mesabi reserves.

Alastair Stevenson
Wills, Bickle & Co.
Toronto

• *The story, "Iron Ore Supplies Will Outlast Us" (Nov. 7, page 87), reports that Lake Superior direct-shipping ores from the open pits will decline from 50 million gross tons today to 5 million gross tons in 1970. Underground direct-shipping ores will remain constant over the next 15 years at 20 million gross tons annually.*

These data came from a U. S. Bureau of Mines booklet, Iron, A Chapter from Mineral Facts and Problems, *by R. W. Holliday. It is available for 20 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.*

A Bell Ringer

The article, "Keep Your Product Growing" (Nov. 14, page 101), rang the bell with us. Please send two copies.

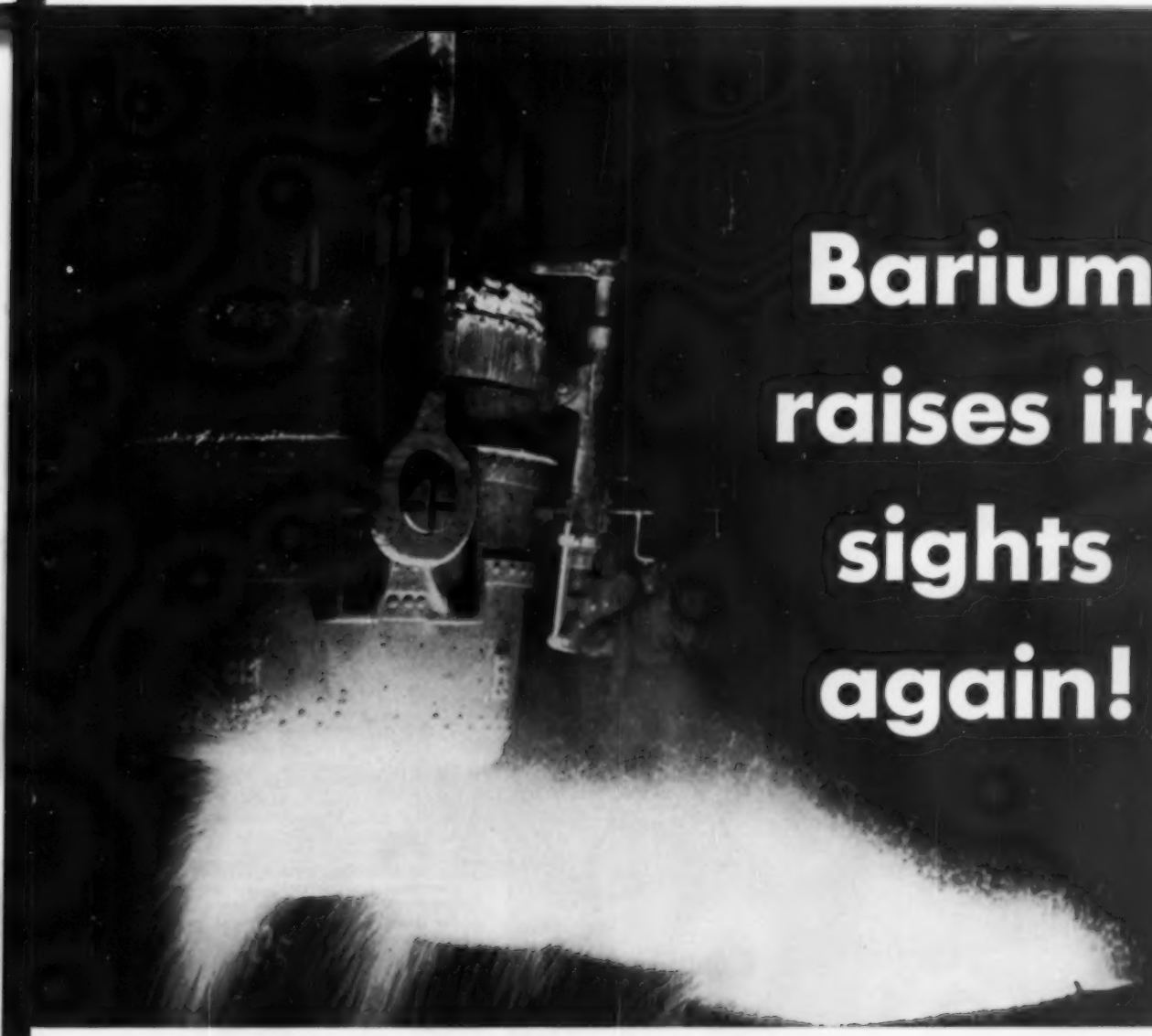
Dan Thompson
Sales Promotion
Stewart-Davis Inc.
Gardena, Calif.

After reading this article, the only possible comment I have is "excellent."

It describes the climate found in organizations badly in need of the services of a research and development firm. It does it in such a way that any current victim of this product-obsolescence sickness will recognize it almost immediately.

The points listed in the section, "Re-

(Please turn to page 12)



Barium raises its sights again!

Merger of steel operations to step up efficiency, increase customer service

Another milestone in Barium's long-term policy of planned integration was reached recently with the consolidation of all steel-making operations under the management of Barium subsidiary Phoenix Iron & Steel Company, Phoenixville, Pa.

Aimed at improving efficiencies still further and broadening Barium's customer service, the consolidation integrates Central Iron & Steel Company, Harrisburg, Pa. (now known as Plate Division), Chester Blast Furnace, Inc., Chester, Pa. (now known as Blast Furnace Division), Structural Division, Phoenixville, Pa. and Phoenix Steel Tube Division, Phoenixville, Pa. (Seamless Tubing), under the management of Phoenix Iron & Steel Company. All now function as Operating Divisions, and will remain in their present locations.

Barium believes this merger will produce a stronger and more flexible operation and set the stage for accelerated growth – not only of the divisions directly involved, but also of the entire Barium organization. For this move is a practical demonstration of the alert management thinking which has expanded Barium from one company to 14 in ten short years. Find out about Barium's soundly diversified family of companies. Write for "The Barium Story." Barium Steel Corporation, 25 Broad Street, N. Y. 4, N. Y.

5.5

STEEL PRODUCERS

Phoenix Iron & Steel Co. (Plate Div.; Structural Div.; Steel Tube Div.; Blast Furnace Div.).

STEEL FABRICATORS & PROCESSORS

Phoenix Bridge Company • Industrial Forge & Steel, Inc. Globe Forge, Inc. • The Geometric Stamping Company

MANUFACTURERS OF END PRODUCTS

Clyde Iron Works, Inc. • Erie Bolt & Nut Company Bayonne Bolt Corporation • The Cuyahoga Spring Company • Jacobs Aircraft Engine Company • Kermath Manufacturing Company • Kermath (Canada) Limited Wiley Manufacturing Company.

LIGHTWEIGHT METAL AND PLASTICS

East Coast Aeronautics, Inc.

14 INTEGRATED COMPANIES

BARIUM STEEL CORPORATION

WORKING IN STEEL, ALUMINUM, MAGNESIUM, FIBERGLASS

LETTERS

(Concluded from page 10)

search and Development Organizations," are the same items we point out to clients.

This article has sound advice in it, together with a lot of important facts about creative research and development firms which have contributed a great deal to the American economy and our standards of living.

Cliff Miller
Public Relations Director
Designers for Industry Inc.
Cleveland

Poof! Out Comes Gas

The article, "Out Goes Hydrogen" (Nov. 14, page 120) was interesting.

You did not mention, however, that we are the sales representatives for Bochumer Verein for the finished production (not the license rights). We are already supplying American and Canadian firms with vacuum poured castings and with forgings made from vacuum cast ingots.

The primary applications are in the electrical turbine field, but we are also supplying high pressure containers and container sleeves for large extrusion presses.

K. Orban
Kurt Orban Co. Inc.
Jersey City, N. J.

Ingredients for Management

Thanks for sending the first seven reprints in your 1955 Program for Management series. I certainly enjoyed reading them. I would appreciate reprints of the last three articles so that I may have a complete set.

The series is a really comprehensive survey of the basic ingredients of managing a modern corporation. STEEL has certainly demonstrated editorial leadership in the conception and execution of this project.

James Dowd
Office of Vice President-Sales
Air Reduction Co. Inc.
New York

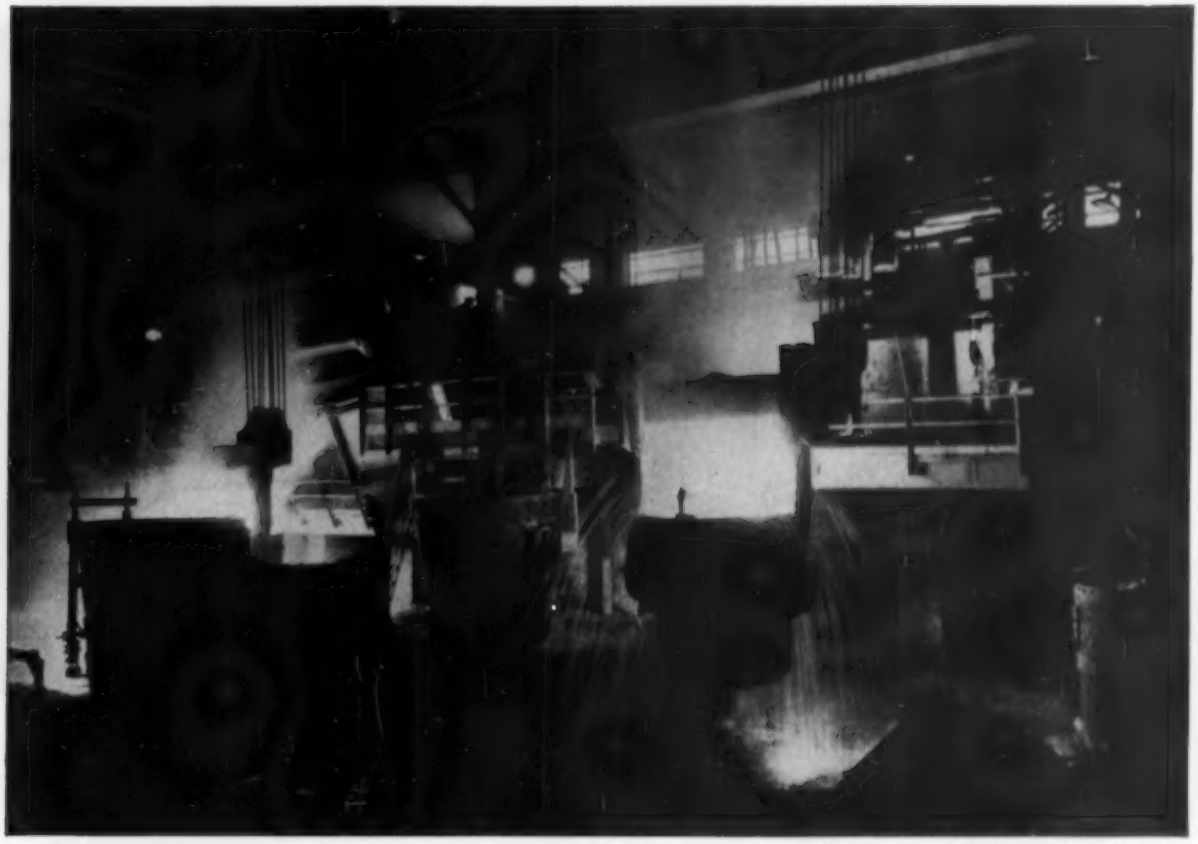
Please send me one complete set. We are subscribers to STEEL, but it seems that the demand for these articles is so great that they are removed by others before I get a chance to read them.

W. P. Pikunas
Engineering Department
Alloy Mfg. Co. Inc.
Pittsburgh

I heartily join with H. W. Olander of Allis-Chalmers Mfg. Co. in his "Congratulations on your 1955 Management Series" letter published in the Oct. 31 column of Letters to the Editors.

I shall deeply appreciate it if you will send me copies of this series, also.

J. D. Mangilit
Assistant Plant Engineer
San Juan Shops
Atlantic, Gulf & Pacific Co. of Manila
Manila, Philippines



Crucible Steel, Midland, Pennsylvania

"Cities Service Heat Prover helps make special steel, saves fuel"

THE CITIES SERVICE HEAT PROVER...

Not an instrument that you buy... but a service we supply!... FREE!

Crucible Steel Company of America is another leading steel company that has found the Cities Service Heat Prover a valuable aid in its furnace operation.

Here's what Crucible has to say about the Heat Prover at its Midland Works, one of several where it is in constant use.

"The Heat Prover has become our standard tool for the setting up and checking of combustion controls on our many furnaces at Midland. It has also helped immensely in setting up special atmospheres for special grades of steel by providing fast and reliable analyses, and has been particularly instrumental in the improvement of fuel economy. Cities Service has kept the Heat Provers in perfect running order and on many occasions has gone out of its way to help us."

You, like Crucible Steel, can achieve better results in *your* furnace operation with the Cities Service Heat Prover. Supplied and maintained free by Cities Service, it offers easy portability, rapid continuous sampling, simultaneous reading of oxygen and combustibles. For more information, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

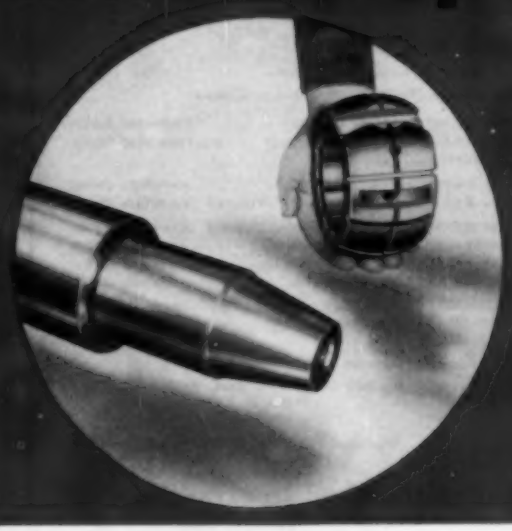
Features that reduce cost ..

Landis 10" x 36" Type CH Plain Grinder

LANDIS

precision grinders

increase operator output



FAST STOCK REMOVAL

"Rigidized" Microsphere bearings and spindles increase production by heavy cuts without loss of finish and accuracy. A Landis exclusive.

SETUP TIME REDUCED

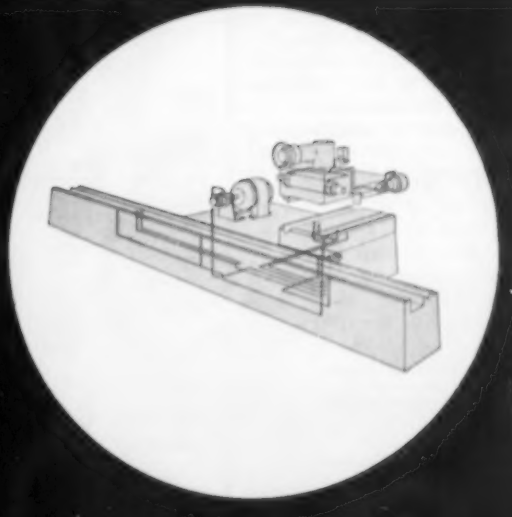
Centralized controls speed setup to give more production time. Controls handy for operator save motion and reduce fatigue.

EYE LEVEL WHEEL FEED

The wheel feed is at eye-level—Easy for operator to watch grinding and wheel feed graduations without moving.

PROTECTED LUBRICATION

Automatic spindle and way lubrication for dependable operation and machine protection. This is a schematic diagram.



LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

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USS COR-TEN STEEL

gives strength and extra corrosion resistance to hull of pleasure yacht

The pride of Ingalls is the new Rhonda III. This new yacht, which features many other new shipbuilding practices in addition to the use of light weight, corrosion-resistant COR-TEN Steel hull construction, was designed by M. Rosenblatt & Son, Naval Architects and Marine Engineers of New York City.

The Ingalls Shipbuilding Corp., of Birmingham, Alabama, has been constructing ocean-going vessels of many types for more than 25 years. This vast experience paid off when it came to the design of this beautiful new-type 96-foot yacht—and the decision to use USS COR-TEN High Strength Steel to give extra strength and corrosion resistance to the Rhonda's hull.

In a new booklet describing many of the unusual features of their new RHONDA III, The Ingalls Shipbuilding Corp., explains their reasons for the choice of USS COR-TEN High Strength Steel:

"Rhonda III is constructed almost entirely of all-welded COR-TEN corrosion-resistant steel. No rivets whatsoever are used. Most hull plating is 7.65 pounds or 3/16" thick. Early in the design stage extensive investigations and tests of specially designed steel panels with widely spaced weld beads were conducted to determine optimum size and length of welds for the best possible combination of strength and fairness. In the opinion of the designers, whose experience covers many years of foreign as well as domestic yacht and ship building, RHONDA III's hull is the finest example of a fair light welded steel hull. Despite this, strength and sea-worthiness have in no way been compromised."

Here again USS COR-TEN High Strength Steel was selected because of its proved ability to reduce deadweight and to stand up under corrosive conditions—even when it's the severe combination of salt water and ocean atmospheres.

NOW AVAILABLE . . . our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for greater economy and efficiency by the sound use of high strength steels.

For your free copy, write on your company letterhead, giving title or department, to United States Steel Corporation, Room 5049, 525 William Penn Place, Pittsburgh 30, Pa.

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USS HIGH STRENGTH STEELS

USS MAN-TEN · USS COR-TEN · USS TRI-TEN

USS

S-1827

UNITED STATES STEEL

"A Tough Job Today—*Routine Tomorrow*"

says
R. O. Thomas
U. S. Steel's
Forging
Superintendent

THE PICTURE SHOWS the very heart of a horizontal extrusion press being built by the Loewy Construction Company for the Air Force heavy press program. It is the press container—forged, machined and assembled at the U.S. Steel Homestead Forgings Division.

It is the container which must sustain the high pressures exerted on the hot billet as it is forced through a die to form the extruded shape. In extruding an aluminum alloy, for example, the container itself is electrically heated to above the 800° F temperature of the billet—hot enough to soften ordinary steels.

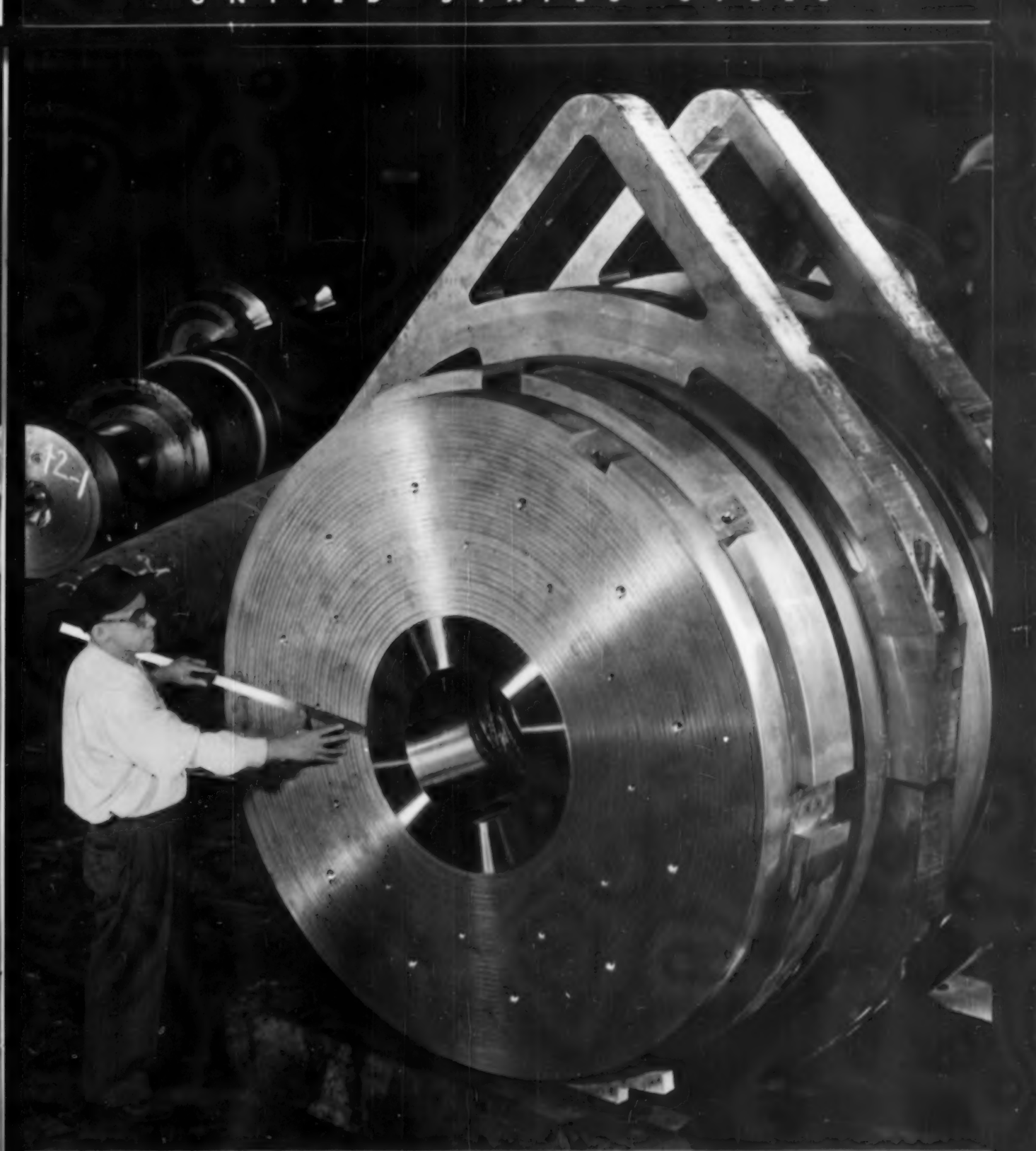
This container is made by shrinking together several steel sleeves, similar to the way big naval guns are constructed. The result is an extremely strong assembly without undue bulk, able to withstand the tremendous pressure exerted during extrusion. The liner (the highly polished inside part), primarily a heat resistant member, is forged from tungsten-chromium-molybdenum-steel, heat treated to a very high hardness to resist deformation. Over this liner is a heavy forged alloy steel liner holder. Next come five forged alloy steel rings that build the total outside diameter to over six feet.

When this press was first proposed, some segments of the industry felt that it would be most difficult, if not impossible, to meet the specifications. In answer, the first units have been shipped from the Homestead Forgings Division after passing all requirements . . . and more units are on the way.

If you would like a free copy of our 32-page booklet that gives the background of USS Quality Forgings, write to United States Steel, Room 5049, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

SEE THE UNITED STATES STEEL HOUR. It's a full-hour TV program presented every other week by United States Steel. Consult your newspaper for time and station.

UNITED STATES STEEL



USS Quality FORGINGS

- heavy machinery parts — carbon, alloy, stainless
- forged steel rolls and back-up roll sleeves
- electrical and water wheel shafts
- hammer bases and columns

SIDE WALLS AND FLAT ARCH ROOF on this batch-type annealing oven at Terre Haute Malleable & Mfg. Corporation, Terre Haute, Indiana, were installed quickly and economically with a castable refractory—Kast-O-Lite—a Lumnite-base castable manufactured by A. P. Green Fire Brick Company, Mexico, Mo.

CASTABLES: fast—economical—reliable

Lumnite-base castables are bringing new speed and economy to countless refractory installation and repair jobs. They're so easy to use. Just add water, mix, and you're ready to place refractory or insulating concrete.

Packaged castable mixes made with Lumnite* calcium-aluminate cement and selected aggregates are carefully proportioned to provide specific concretes to meet a wide range of temperature and insulation requirements. Because they are pre-mixed, such castables give quality results with added convenience. They are made and distributed by leading manufacturers of refractories.

Industrial concretes made with Lumnite cement or Lumnite-base castables have many uses—in forge plants and heat-treating shops, for annealing furnace car tops and roof arches, door linings, forge furnace arches; for furnace foundations, core ovens and many other installations. Write for detailed information.

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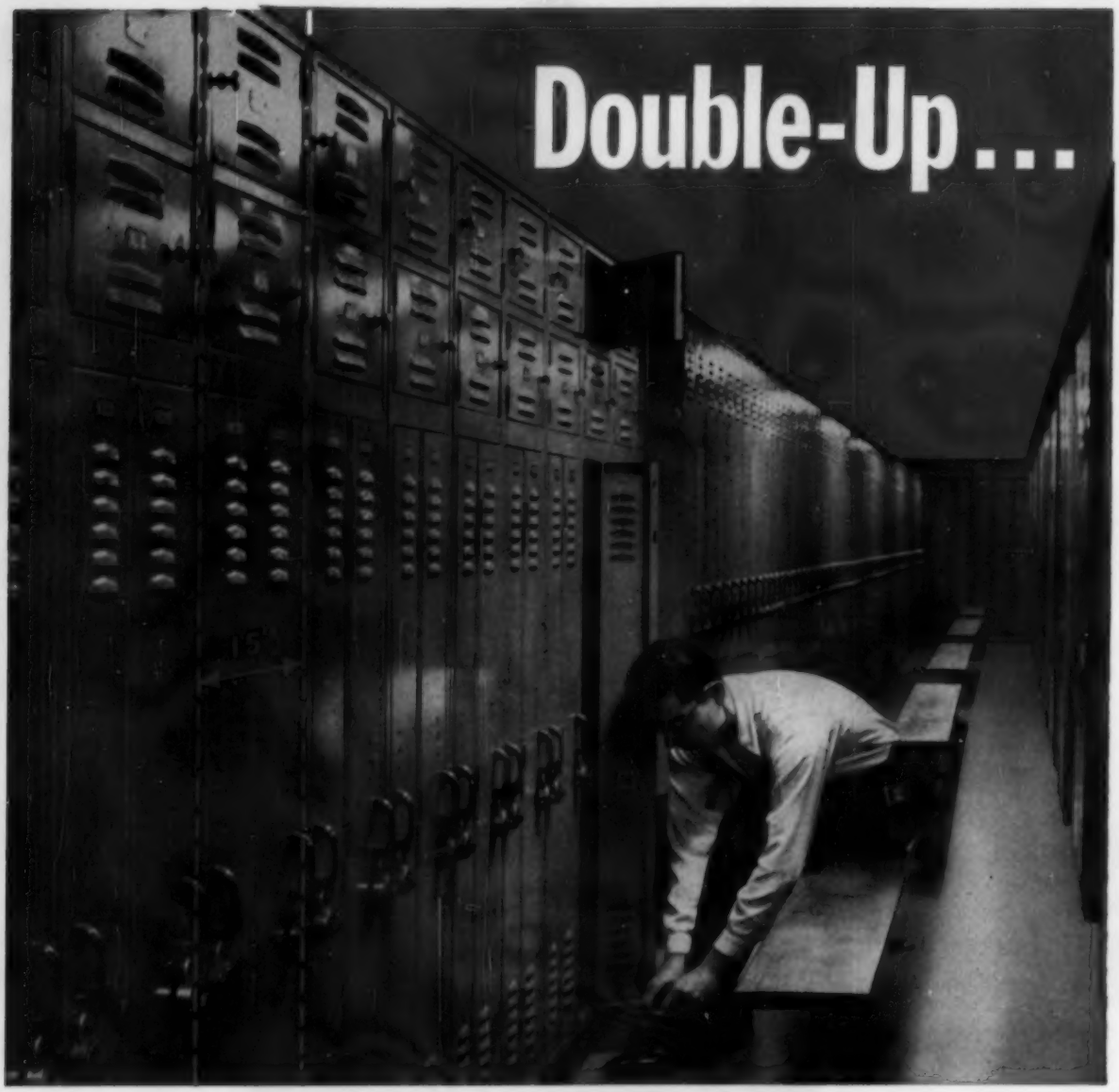

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3120 East 45th Street
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It's the ideal locker where space must be conserved—or utilized to obtain the maximum number of locker accommodations.

A standard 15" in width, the Republic "Spacesaver" two-person locker, made by the Berger Division, provides separate compartments for two people in no more floor area than that required for one large individual single-tier locker. And yet the occupant has ample room to store his street wearing apparel and other personal effects.

Each compact locker is equipped with Berger's unique pre-locking door. The door operates with either a built-in lock or a padlock. It is designed to provide locked security the instant it is closed. When a padlock is used, for example, simply relock it in the loop immediately after the door is opened. There's no need to rely on memory to safeguard belongings once the door is closed. There's no separate locking of the hat compartment to bother with, either. When closed, it locks simultaneously with the lower door by a foolproof innerlocking device.

Modern steel lockers that provide clean, safe storage for clothing and valuables can be a powerful aid to good employee relations. Investigate Berger's big line of quality lockers. Let Berger, the world's largest supplier of steel storage facilities, help you with your design, engineering or installation problems. Call your local Berger Sales Office. Or send coupon for descriptive literature.

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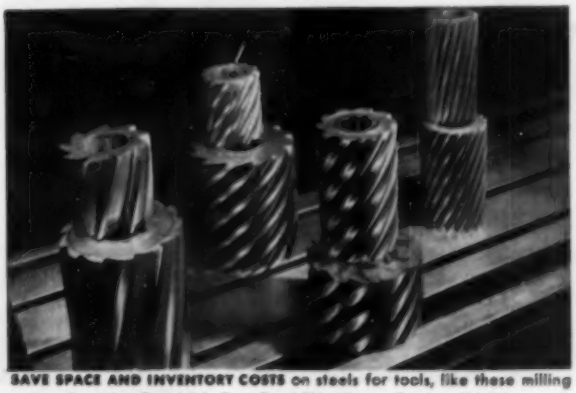
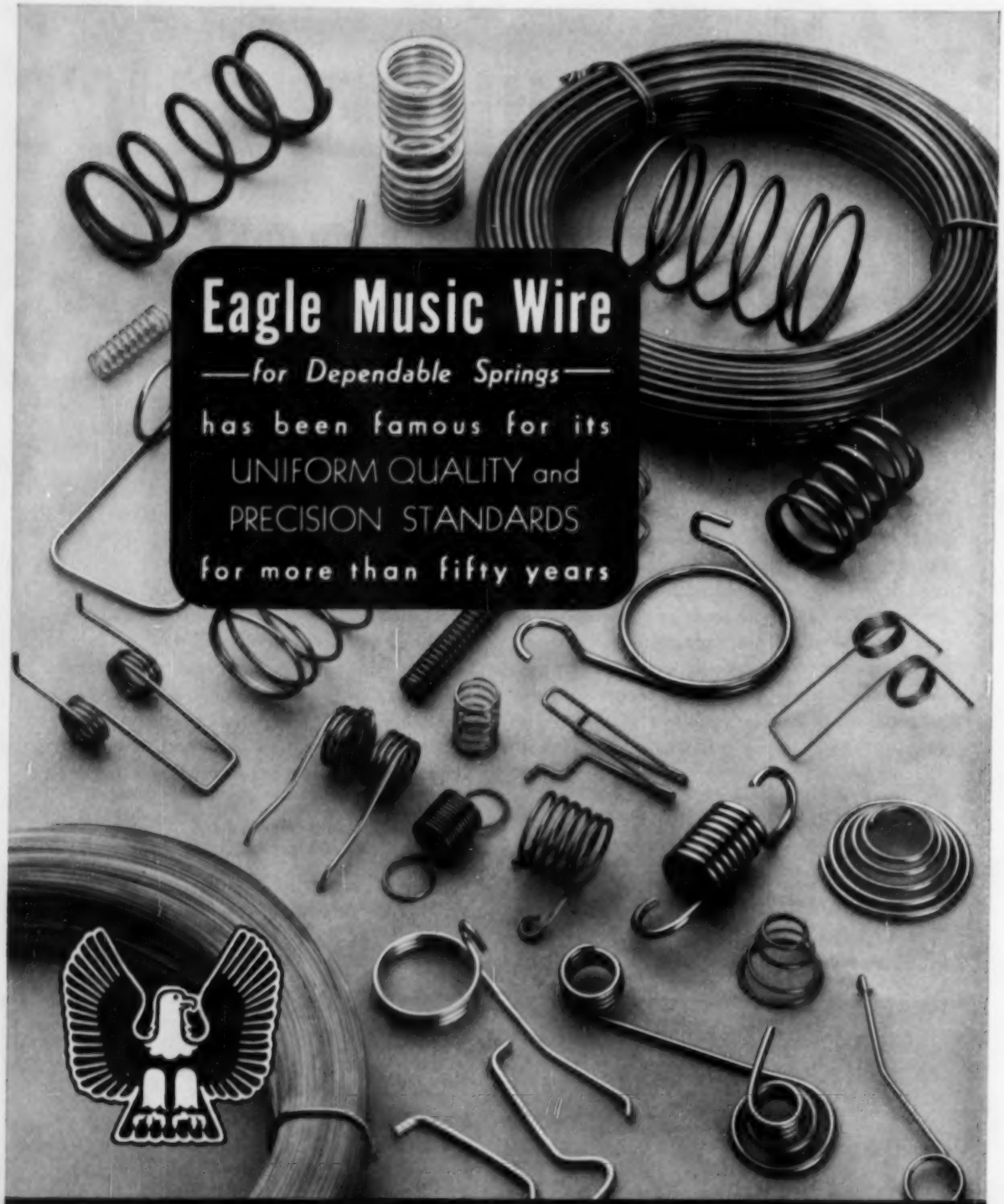


SAVE SPACE AND INVENTORY COSTS on steels for tools, like these milling cutters, by using Republic's Tool Steel Warehouse Service. Warehouses in Detroit and Cleveland carry complete stocks of tool steels, automotive die steels, precision-ground flat stock, cold-drawn shank steel. A phone call brings what you need in a hurry, whether it's one piece or a truckload. Questions on steels, dies, heat treating and machining are answered expertly and promptly by our tool steel metallurgists.

ELIMINATE PLANT OVERHEAD AND LARGE TOOLING INVESTMENTS by using the Berger Division's production facilities to fabricate your product. Berger's specialized service is complete, from engineering through fabrication, finishing, packing and shipping. A large stock of standard tools, dies and equipment is also available. As soon as a sketch or blueprint is finished, send to Berger with complete specifications. They'll advise promptly what can be done. Mail coupon for Bulletins 793 and 908.



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CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

The choice of leading mills for back-up roll bearings

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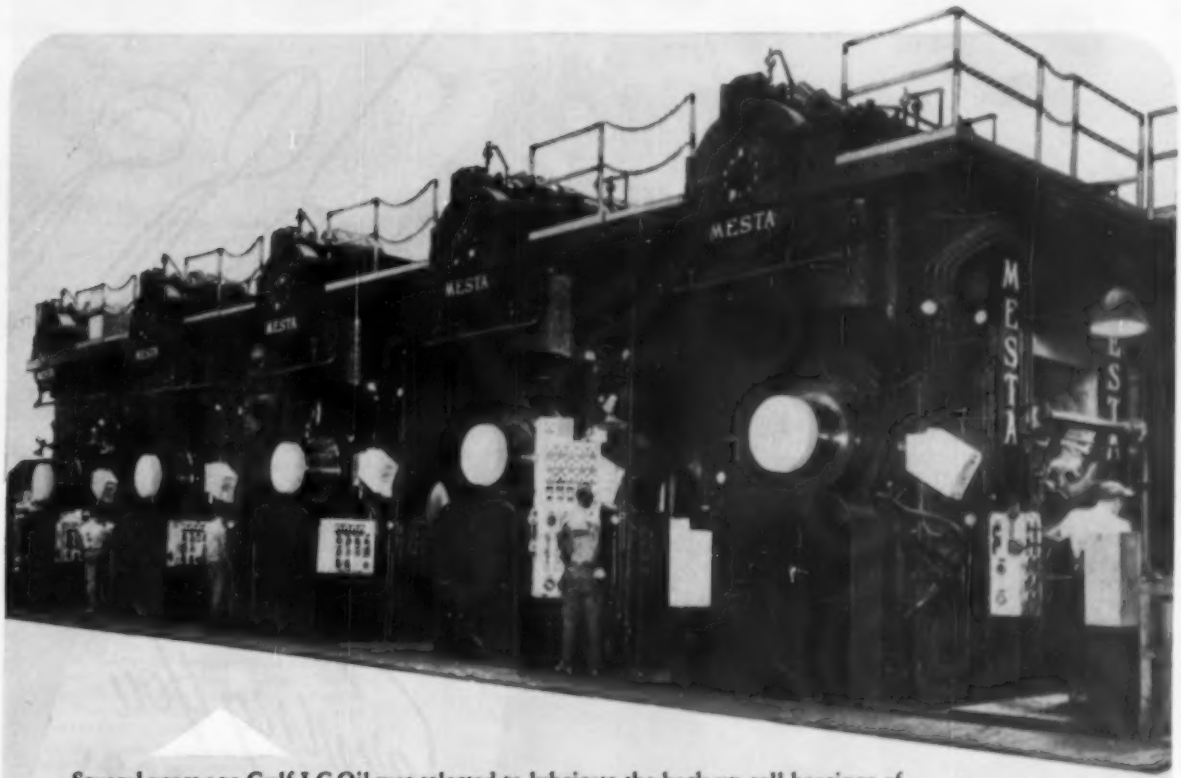

Several years ago Gulf I-C Oil was selected to lubricate the back-up roll bearings of the world's fastest cold strip mill at U. S. Steel's Fairless Works. Today it is still doing an outstanding job of providing effective protection as the strip shoots through the rolls at speeds up to 7000 feet per minute.

Gulf I-C Oil has excellent stability, resists emulsification and sludging, plus rapid water separating characteristics. These properties keep bearings and oil lines clean, contribute to longer bearing life, trouble-free performance, and lower maintenance costs.

So when you next order a roll-bearing lubricant, make it an order for dependable, efficient lubrication by specifying Gulf I-C Oil. Contact your nearest Gulf office and have a Gulf Sales Engineer recommend the proper grade for your equipment. Gulf Oil Corporation · Gulf Refining Company, 1822 Gulf Building, Pittsburgh 30, Pa.

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CALENDAR
OF MEETINGS

Jan. 3-6, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-12, Industrial Fasteners Institute: Winter meeting, Royal York hotel, Toronto, Ont. Institute's address: 1517 Terminal Tower, Cleveland 13, O. Secretary: R. B. Relford.

Jan. 11-13, Aluminum Extruders Council: Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 18-19, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

Jan. 18-19, Steel Shipping Containers Institute Inc.: Winter meeting, Hampshire House, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 19-20, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 20, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

Jan. 23-24, Industrial Heating Equipment Association: Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

Jan. 23-25, Truck-Trailer Manufacturers Association Inc.: Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24, Cutting Tool Manufacturers Association: Annual meeting, Detroit Yacht Club, Detroit. Association's address: 416 Penobscot Bldg., Detroit 26, Mich. Executive secretary: Martin J. Ewald.

Jan. 24, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York 4, N. Y. Secretary: Parke Hodges.

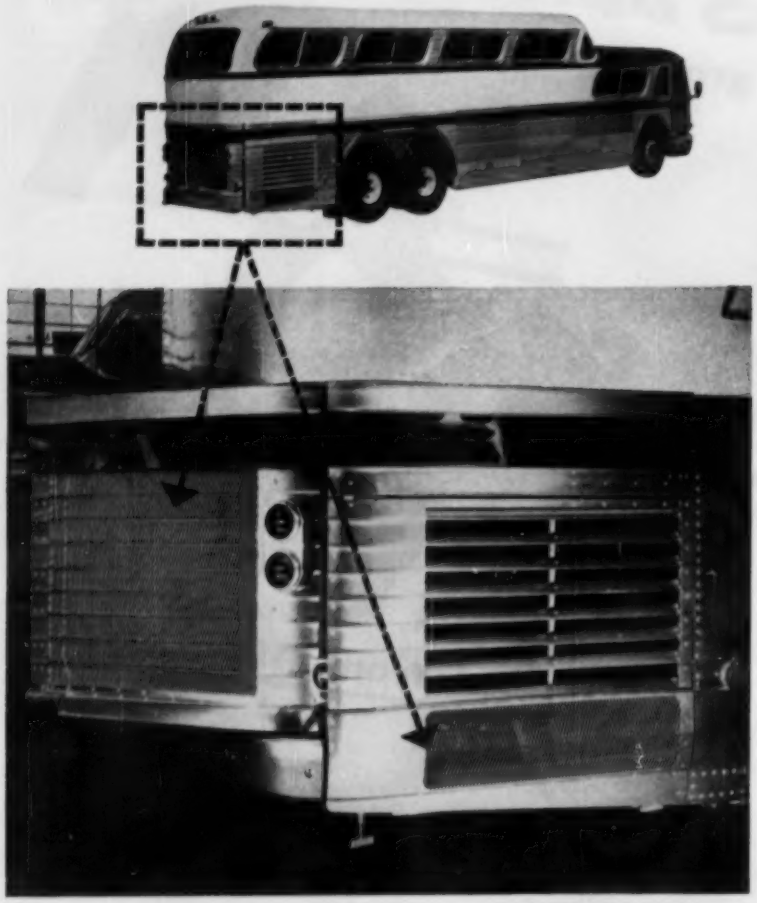
Jan. 24-27, American Management Association: General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

Jan. 26-27, Blast Furnace & Coke Association of the Chicago District: Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.

Jan. 28-Feb. 4, Industrial Diamond Association of America Inc.: Annual meeting, Hollywood Beach hotel, Hollywood Beach, Fla. Association's address: Box 175, Pompton Plains, N. J. Executive manager: Athos D. Leveridge.

Jan. 30-Feb. 3, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

DESIGN for lasting beauty and utility with *EXPANDED STAINLESS STEEL*



Shining examples of expanded stainless steel beauty, are the panels for the engine compartment of the large passenger coach shown here.

They're in perfect harmony with the rest of the stainless exterior. And, they are corrosive-resistant, easy-to-clean, durable. What's more, the open mesh permits air to circulate freely.

Penmetal expanded stainless steel is sheet metal that has been slit and expanded to as much as ten times its original width. Up to 80% lighter than solid sheet of the same dimensions, the diamond truss pattern adds rigidity and strength. Also available in carbon steel, aluminum, Monel, Inconel and other metals; large or small mesh; light or heavy gauge.

With its clean modern look, high utility, yet economical cost, Penmetal expanded stainless steel might well be your first step towards new markets and new profits. For details of Penmetal expanded stainless steel, send for new folder 506-EM.

PENN METAL COMPANY, INC.

General Sales Office:
205 East 42nd Street, New York 17, N. Y.
Plant: Parkersburg, W. Va.

Penmetal

EXPANDED STAINLESS STEEL shelf in low temperature refrigerated water bath. The exterior expanded metal is of carbon steel.

PM-71

ANNOUNCING...

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Strong . . . highly resistant to corrosion . . . nonmagnetic . . . extremely conductive

Now you can use Rollpin to cut assembly and maintenance costs in a whole new group of applications. A new line made of beryllium copper, one of the strongest of the copper base alloys, opens the door to a wide variety of uses where resistance to corrosive attack, good electrical properties and other unusual characteristics are required. These slotted tubular copper spring-pins can be used in assemblies that range from plumbing fixtures to electrical instruments, particularly in conjunction with other copper base alloy components.

Rollpin has already established its ability to replace taper pins, straight pins and set screws; to serve as a rivet, dowel, hinge pin, cotter pin or stop pin . . . eliminating special machining, tapping and the need for hole reaming or precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can be readily drifted out and reused whenever necessary.

Rollpin is available in beryllium copper from .062″-diameter to .250″-diameter, and in steel and stainless steel up to .500″-diameter.

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Dept. R35-1260, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

☐ Data on beryllium copper Rollpin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

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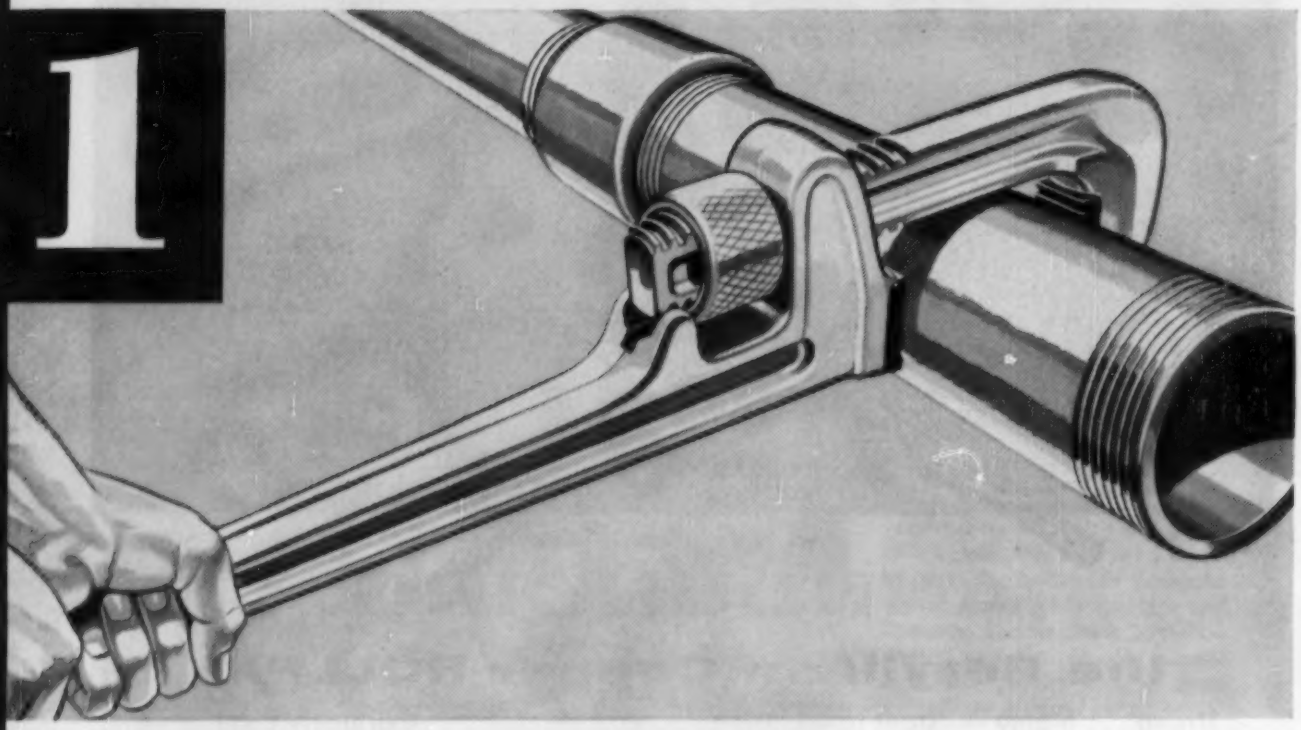
This company made a better product with the help of Alcoa's Development Division

1



International Forge Company makes a better pipe wrench

They used to call these 3-foot pipe wrenches "man killers". That was before aluminum reduced their weight from 20 pounds to only 8.

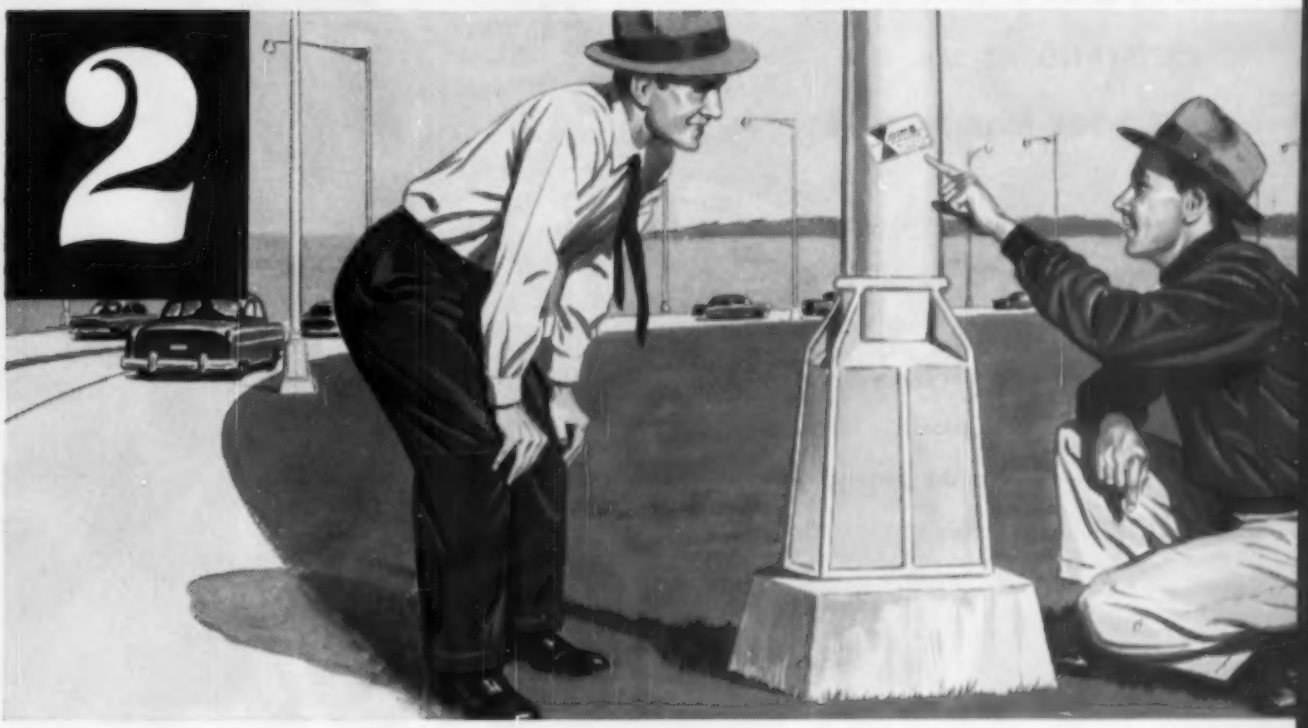
International Forge Company set out to improve pipe wrenches to the nth degree. Their engineers designed a complete set of wrenches as aluminum forgings, in sizes from 10" to 36". For strength, the head section of each aluminum wrench had to be larger, yet still compact enough to be used in close quarters.

At Alcoa Development Laboratories, sample wrenches were made with varying head sizes. Each sample was carefully torque-tested and the resulting strains analyzed with electronic strain gages. Alcoa engineers were able to show International Forge Co. the exact design that combines maximum lightness with the strength of steel.

This "revolution in the wrench business" could apply to your business, too—with important competitive results! Experience gained from thousands of such projects is available to you through Alcoa's Development Division. Making your *product* perform better in aluminum could be our *next* job.

DEVELOPMENT DIVISION
ALUMINUM COMPANY OF AMERICA

This company gets strong marketing support with the help of Alcoa's Labeling Program



Pfaff & Kendall adopts Alcoa Label

Pfaff & Kendall, Newark, N. J., pioneers in the production of corrosion-resistant lamp standards for modern highways, made of Alcoa Mill Products. Signing the Alcoa Labeling Agreement enabled Pfaff & Kendall to use the powerful Alcoa label with their own well-known name. The combination assures purchasers of their standards that here is a product with an aluminum pedigree. Thus Pfaff & Kendall shares in the millions of impressions of the Alcoa label that will appear in national magazines and on television in 1955.

The accumulated recognition of the Alcoa name, which for 67 years has stood for the finest in aluminum, is available to Alcoa mill product customers with their use of the Alcoa label. Complete plans and detailed advantages of its use are available from the Alcoa office nearest you, listed under "Aluminum" in your classified phone book.

Your Guide to Aluminum Value

HERE'S THE USG BRUSH THAT DOES AN OUTSTANDING JOB ON ALL YOUR MILL MOTORS

When you replace the brushes on your mill motors, you can get the best results with U S G Grade 135 Brush with Statite®. For brushes that give superb results in other applications, see below. Write for your copy of the complete U S G Brush catalog today.

A typical U S G 135 Mill Motor Brush with Statite*

U S G Grade 1658 Brush for tin line collector rolls

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U S G Grade AH897 Brush for welding generators with Statite*

U S G Grade 550 for AC Crane Motor Rings

*Permanent shunt connection, needing no hammerclips; cannot be jarred loose or pulled out.

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is ready to help you increase production
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THE GISHOLT ROUND TABLE
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.
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TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

The world's largest opens a new era of

ABOUT one year ago, the largest die-casting machine in the world was completed and put into operation by Doehler-Jarvis Division of National Lead Company in cooperation with Kaiser Aluminum & Chemical Corporation.

Recently, the huge machine successfully produced the largest aluminum die-casting ever made—a six-cylinder in-line engine block weighing about 130 pounds less than a similar gray iron block.

The successful production of such a large and complex die-casting points the way to the design of large and economical die-cast aluminum parts for many industries.

Such parts would benefit from all the advantages of the die-casting process, which is inherently suited for mass production of parts requiring close dimensional tolerances, smooth surfaces, clean and sharp detail and thin metal sections.

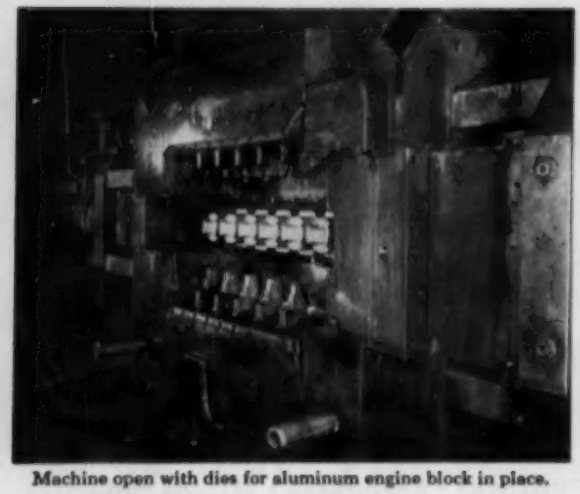
It is also possible to cast many details to size on the large press. In many cases, this eliminates the need to drill holes and other machining operations. Threads may often be cast to size, thus eliminating a threading operation. Cast-in metal inserts are readily included in die-castings.

Overall dimensional accuracy is another feature of die-castings that is important to many parts. This reduces the amount of finish allowance when parts are machined to a prescribed overall dimension.

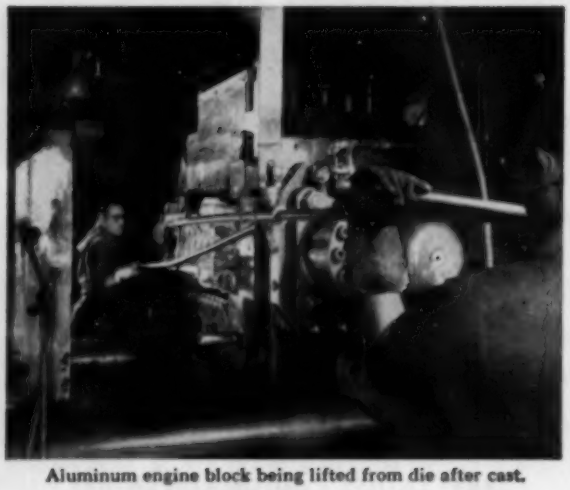
In addition, die-castings are generally lighter in weight than the equivalent parts made in sand or permanent mold, because thinner metal sections and less draft are permissible.

The metal quality of die-casting is more uniform than in a typical sand casting. Therefore, service life is more uniform.

Product designers and engineers should investigate this new Doehler-Jarvis Division of National Lead development in aluminum die-casting without delay to see if your existing or new designs can take advantage of the new 72" machine.

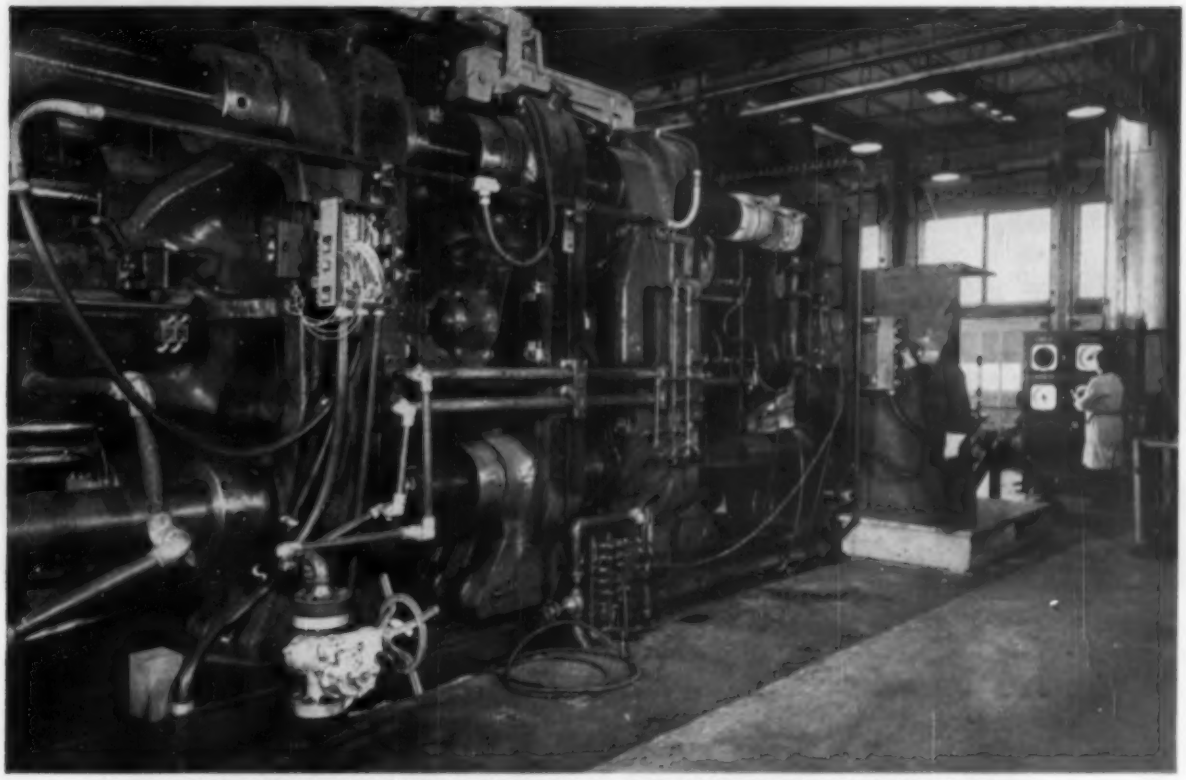


Machine open with dies for aluminum engine block in place.



Aluminum engine block being lifted from die after cast.

die-casting machine product design!



The new Doehler-Jarvis 72" die-casting machine—the world's largest—located at Toledo Plant.

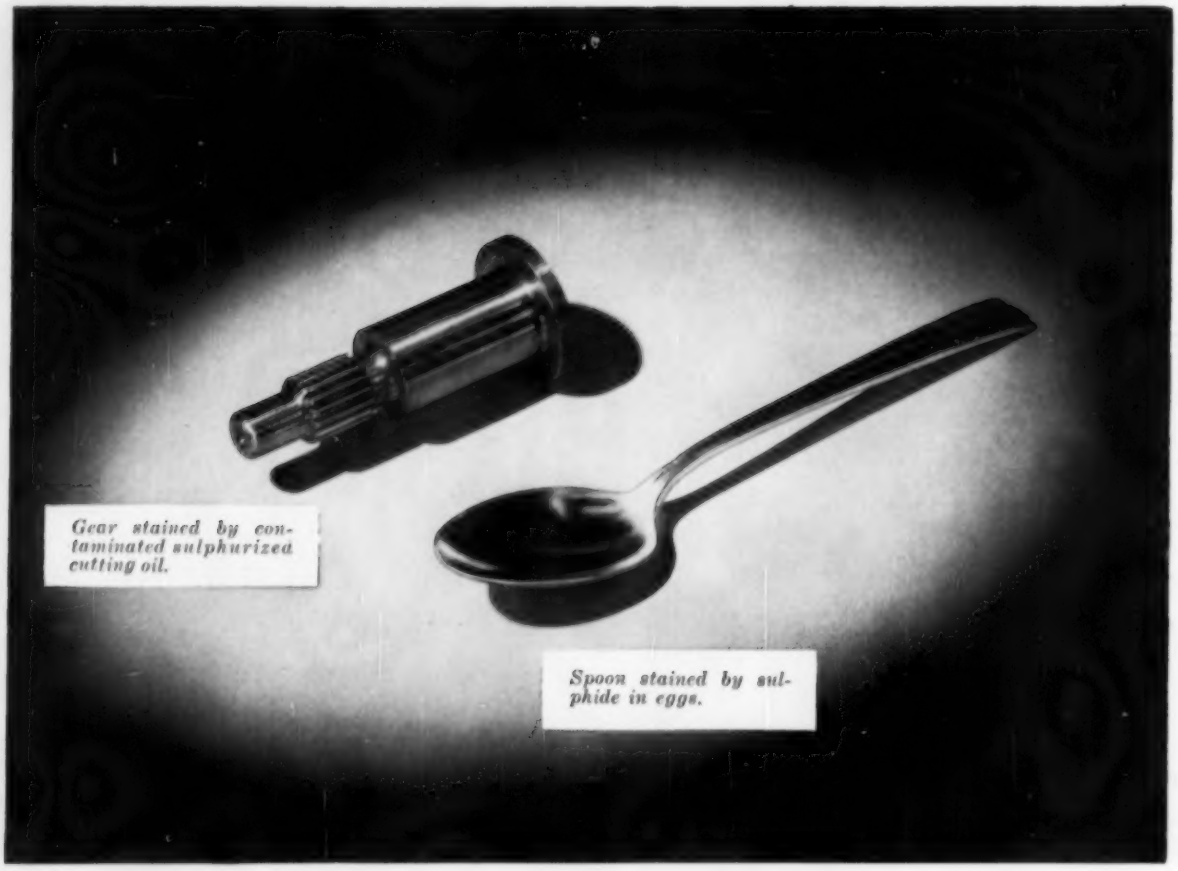
Engine blocks were die cast by Doehler-Jarvis.

If you need assistance with aluminum . . .

Let us work in partnership with you. We are eager to share our knowledge of aluminum and engineering skill. Development engineers will gladly provide engineering service and counsel on design and alloy selection which may give you a better product at a lower cost. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago 11, Illinois; *Executive Office*, Kaiser Bldg., Oakland 12, California; DETROIT OFFICE, *1414 Fisher Bldg., Detroit 2, Michigan, Phone Trinity 3-8000.*

Kaiser Aluminum

setting the pace—in growth, quality and service



Sulphur Staining on Ferrous Parts is Harmless

Staining of machined ferrous parts caused by cutting fluids containing active sulphur is similar to the stains you find on your silverware. It has no adverse effects whatsoever on the finish, or characteristics of the metal. *It is not corrosion*, and according to automotive and military authorities, in no way affects service life.

Experience has proved that cutting fluids containing active sulphur provide far better performance when machining the tougher steels. Staining can only occur during very humid conditions or when water is allowed to contaminate the sulphurized cutting oil. A sample piece of metal will not stain in a cutting fluid free of water . . . but often it will the moment moisture is added.

The *important* factors to consider when selecting a cutting fluid are surface finish, production and tool life. Here is where a cutting fluid pays for itself. Ask to have "the Man in the Barrel", your Stuart Representative, help select that Stuart Oil that will produce the very best results under the conditions you will subject it to.

Further information on sulphur staining is provided in the D. A. Stuart Shop Note Book, Bulletin S-1. Write for your copy.

D. A. STUART OIL COMPANY, LTD.
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HOW A NATIONAL-STANDARD WIRE DEVELOPMENT *keeps her hair prettier all day long*

Millions of pounds of steel are used each year to make bobby pins.

And it's a tricky steel to make, as we learned while developing it . . . tricky, that is, if our customers were to avoid fabricating troubles and hold manufacturing costs to a minimum.

We had to produce a special kind of round wire that could be flattened without cracking. It had to have an extremely uniform finish to facilitate coloring and to permit high speed processing without frequent costly adjustments of machinery. It had to be suitable for tempering to give the right springiness and tension.

Not only did our engineers succeed in meeting all of these challenges, but they also were able to save our customers money on manufacturing, packaging and handling.

We solve problems like these every day for our customers and give them better, more complete service than they get elsewhere. That's why National-Standard is industry's foremost supplier of special wire, wire cloth and strip steel. May we serve *you*, too?

NS NATIONAL-STANDARD Company NILES, MICHIGAN

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Tire Wire, Stainless, Fabricated Braids and Tape
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Round and Shaped Steel Wire, Small Sizes

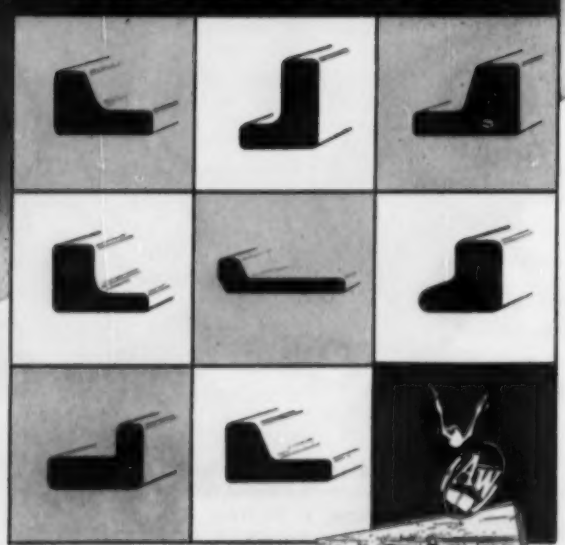
Rings welded from THIS SHAPE

instead of THIS BAR

SAVED $112,084.00

on a single order of flash-welded rings!

TYPICAL MILL-ROLLED AND EXTRUDED SHAPES AVAILABLE FROM AMERICAN WELDING



Send for Free Catalog of Production Facilities

Find Out What American Welding Can Do For You

Substitution of a mill-rolled section for a forging previously used, cut the weight of a rough ring 114 lbs. Combined material and machining savings realized in the finished ring amounted to $200.15 per ring —a total of $112,084.00 on a single order.

Economies like this are being effected every day by roll-forming and flash butt-welding of special mill-rolled shapes. Perhaps our Industrial Products Division can help you reduce production costs on similar circular components. Write today for complete information — include blueprints — we will be glad to study your problem.

AMERICAN WELDING

THE AMERICAN WELDING & MFG. CO.

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Metalworking Outlook

Freight Car Dilemma

Watch for new freight car orders in 1955 to total nearly 162,000, the highest figure since 1922. Of that total, only 15,500 were ordered in the first five months of the year. The rush began in June and has become a stampede in November and December. New orders for this period are expected to hit the 87,500 mark. Therein lies the problem of the carbuilders. They're too late in ordering steel, especially plates. As a result, they'll be lucky to build 70,000 cars in 1956, although they'll start the year with orders for nearly 145,000.

Electronics: In Top Ten by 1965

Look for electronics to become one of the top ten industries in the next decade. Frank M. Folsom, president, Radio Corp. of America, believes that by 1965 the industry will employ more than 6 million and will have an output well over $18 billion. The 1955 production will total more than $12 billion, compared with $1.6 billion in 1946.

Lift for Materials Handling

Makers of materials handling equipment hope for a lift in 1956 sales over this year's. The next six months are almost certain to see improvement; second half prospects aren't so certain. Sales bookings for 1955 have been more than 20 per cent over those for 1954. The Material Handling Institute bases its optimism primarily on the upward trend in new plant and equipment spending.

Comforting Business

The air conditioning industry's retail sales in 1956 will reach a cool $3.2 billion, a new record. The biggest percentage growth will come in residential units, with central air conditioning installations in homes increasing to about 200,000 for the year and bringing retail sales of some $330 million. Cloud Wampler, chairman and president, Carrier Corp., predicts that by 1960 central systems will be installed in more than 500,000 homes annually. By 1965, he thinks that will have increased to 1,150,000 a year at a retail value of about $1750 million.

Canadian Boom

Canada's having a boom, too—its gross national product will hit a record $26 billion this year. C. D. Howe, minister of trade and commerce, expects good times to last well into next year, wipe out Canada's budgetary deficit and provide a surplus. Prospect: Taxes may be reduced slightly.

Checks on BAC?

House investigators want a close check on Commerce Secretary Sinclair Weeks' business advisory council. "BAC can claim all privileges and im-

munities of executive departments of government," claims a majority of the judiciary subcommittee investigating businessmen in government. Majority of the subcommittee is Democratic. Republicans on the group differ. Their minority report says straitjacket regulation of BAC would threaten the free exchange of ideas between government and industry. Started in 1933, the advisory council is a privately financed group of top businessmen who offer advice to the secretary of commerce.

Coming: New Military Needs

The possibility of nuclear neutralization or a military stalemate is generating a new set of military requirements, says Assistant Air Secretary Trevor Gardner. Mr. Gardner rules out the need for matching aircraft production of Soviet Russia. He urges that the always inadequate research and development program be given sufficient funds in the next fiscal year. He adds: "A modern force of not less than 137 wings" is essential.

Executive Pay: Slow Gains

Compensation paid to more than 25,000 executives in 3000 companies increased last year by only 1.8 per cent, on the average. The percentage refers to total compensation including salaries, bonuses and company contributions to retirement funds paid in the year that ended between Dec. 31, 1954, and June 30, 1955. For a comparable period, hourly rates paid to manufacturing workers increased 5 per cent. That percentage includes only wages, not fringe benefits. The American Management Association reports that formal salaries paid to officers increased 2.7 per cent, but that was partly offset by bonus payments 4.8 per cent below those of the previous year.

Ahead in Congress

A good bet for the next session of Congress: Passage of a bill that will require unions to make annual reports to the government on the financial operations of all welfare funds. AFL-CIO is on record as approving such a step. A Congressional committee investigating union management of such funds is finding ample evidence that policing is needed . . . The committee, headed by Sen. Paul Douglas (Dem., Ill.), is also raising the question of whether a company must reveal full details on costs and investment portfolios of insurance and pension funds. U.S. Steel Corp. and General Motors Corp. argue that revealing details might have a harmful market effect and put them at a disadvantage in labor negotiations.

Straws in the Wind

Demand is spiraling for water meters, says Rockwell Mfg. Co. . . . Studebaker-Packard Corp. has received a multimillion dollar contract to make J-57 parts for the Air Force jet engine program . . . Chemical industry sales during 1955 will reach a record $23 billion . . . GM plans a new plant around Hudson, O., probably a stamping facility for its Fisher Body Division.

Do you <u>really</u> <u>know</u> the alloys you buy?

For instance, are you SURE of:

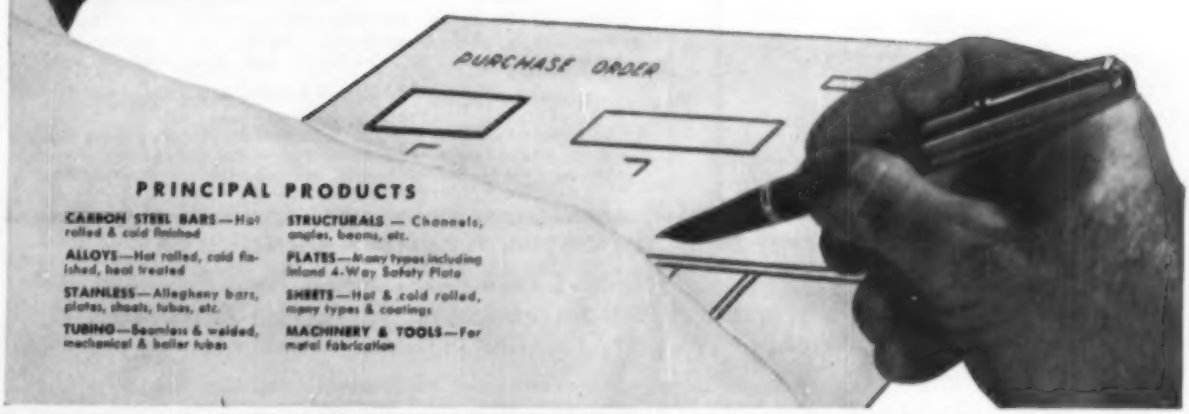
- **Heat identification** . . . not just type identification but the positive identification of your particular heat so you can be sure the alloy steel is everything it is supposed to be?
- **Chemical analysis** . . . not just the chemical range for the type, but the specific analysis of the heat from which your steel was rolled?
- **Hardenability** . . . not just the average hardenability for the type of alloy, but the actual test-proved hardenability of your particular heat of steel?

If you don't know these important facts, you may be in for trouble—loss of time and money; breakdown of equipment. It can happen when you're not sure of your alloys.

But when you work with Ryerson alloys you *can* be sure—sure of the steel you get, sure of what it will do—because Ryerson alloys are certified by an 8-step quality control program.

Every step has a specific purpose—every step is designed for your protection, but doesn't cost you a dime. For alloys with all questions answered, call your nearby Ryerson plant.

RYERSON STEEL



PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished

ALLOYS—Hot rolled, cold finished, heat treated

STAINLESS—Allegheny bars, plates, sheets, tubes, etc.

TUBING—Seamless & welded, mechanical & boiler tubes

STRUCTURALS — Channels, angles, beams, etc.

PLATES—Many types including Inland 4-Way Safety Plate

SHEETS—Hot & cold rolled, many types & coatings

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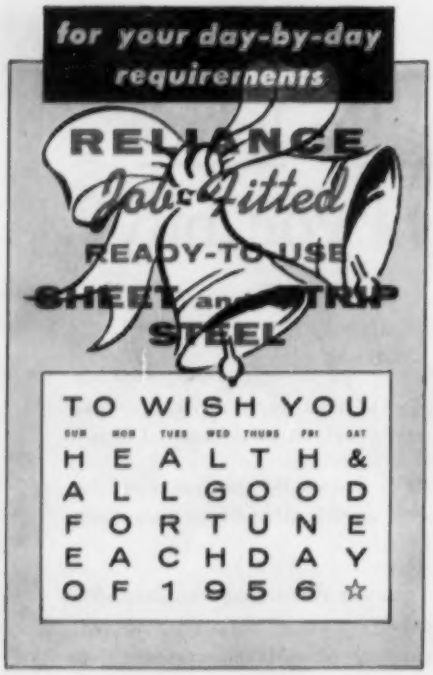

RELIANCE STEEL
DIV. DETROIT STEEL CORPORATION

Processing and Distributing Plants

CLEVELAND PLANT, CLEVELAND 27, O..VUlcan 3-3600
DETROIT PLANT, DETROIT 28, MICH...WEbster 3-5866
EASTERN PLANT, HAMDEN, CONN.....STate 7-5781
MIDWEST PLANT, CHICAGO 8, ILL.....CAnal 6-2442

Reliance Customer Representative Offices

Dayton, O., Des Moines, Ia., Grand Rapids, Mich., Indianapolis, Ind., Jackson, Mich., Milwaukee, Wis., New York, N. Y., Rochester, N. Y., St. Louis, Mo., Toledo, O., Worcester, Mass.

RELIANCE *Job-Fitted* PRODUCTS

COLD ROLLED STRIP STEEL
Coils • Cut Lengths • All Tempers

SHEETS
Cold Rolled • Hot Rolled • H.R. Pickled
Galvanized • Long Terne
Standard or Production Sizes
Sheared or Slit to Actual Working Dimensions

It's no fun ducking orders when we'd rather pluck 'em

Trying to keep on top of mounting demand has been like climbing a greased pole for steel producers. In spite of near-capacity operations, deliveries have been falling behind.

Up to now our own delivery performance has been generally good. To try to keep it that way we are finding it necessary to allocate some products and modify delivery possibilities on others.

Such measures go against our grain. We realize the inconvenience they might work on some customers. But with many customers to think about, we can only do what's right in taking the best care possible of most of them.

To ease the situation, we're rounding out and expanding our steelmaking facilities and capacities, particularly at our Portsmouth, Ohio, plant. Your DSC Customer Representative will be the first to know when relief's in sight.

We'd appreciate it if you'd keep him informed of your requirements. He'll tell you honestly how we stand on our different products. Whenever and wherever we can be helpful, we'll do our very best.

Customer Satisfaction is our No. 1 Job

DETROIT STEEL CORPORATION
GENERAL SALES OFFICE—DETROIT 9, MICHIGAN

DSC CUSTOMER REPRESENTATIVE OFFICES
Charlotte, N. C., Chicago, Cincinnati, Columbus, O., Dayton, O., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

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Low and Medium Carbon Manufacturers' Wire — High Carbon Specialty Wire
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IN FURTHERANCE OF THE METAL STAMPING INDUSTRY

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New Order for Ordering

Pittsburgh industry will increase its spending for capital goods by more than 37 per cent in 1956. The expansion will be greatest in the steel, aluminum and electrical equipment industries.

Plant and equipment expenditures across the country next year are estimated at close to $32 billion. Projected spending for the first quarter of 1956 shows these gains over 1955: Iron and steel, 72 per cent; nonferrous metals, 78 per cent; electrical machinery and equipment, 34 per cent; machinery, except electrical, 45 per cent; transportation equipment, 79 per cent.

An industry-wide survey by this publication shows that three of five metalworking companies plan to install new capacity next year.

The projected expansion is easily the largest program in history. It is evidence of industry's willingness to spend billions to provide the goods needed and demanded by an expanding population. It is evidence of what happens in a dynamic competitive economy when industrial managers have confidence in the rules and the referees.

Next year's expansion is likely to run into one snag. Order books of capital goods producers often are so clogged that many items cannot be delivered when buyers want them. The shortage in structural shapes and plates will delay some industrial construction. Skilled labor will be scarce.

Many programs will not be completed on scheduled dates. Prices, reacting to the forces of supply and demand, will be higher.

The president of a southern steel company chortled happily a few weeks ago as he showed us the blueprints for his expansion program: "We're lucky. We have our structural steel. And we got on the equipment makers' books before the big rush started. We're going to be on schedule. If we had waited six months, our costs would have been a lot higher and the project would be completed a lot later."

We cannot help but wonder why expansion programs have to come all at once. Longer range planning—and buying—would provide substantial economies, insure prompter deliveries and reduce the need for peaking capacity.

In 1954, when steel plate mills were operating at about half capacity, the railroads ordered less than 22,000 freight cars. This year, they are ordering more than 160,000, to accent the pinch on already overburdened plate mills.

The day soon must come when industry will have to plan its buying on a longer range basis. We will have to level out our peaks and valleys. We stand to gain economies and orderly deliveries. We stand to avoid government interference through directives and allocations.

At today's prices, cushion capacity is a luxury we can't afford.

Walter J. Campbell

MANAGING EDITOR

Inland's production balance, ever-sensitive to the varying requirements of midwestern industry for a wide range of carbon steel products, is a real advantage to steel users.

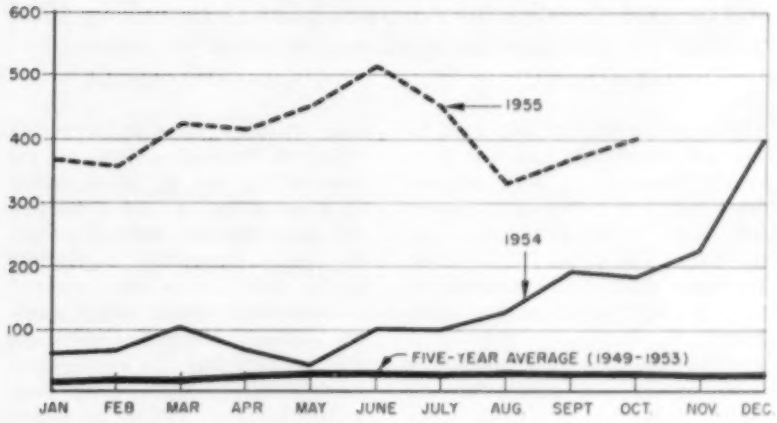
INLAND STEEL COMPANY
38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul Davenport • St. Louis • Kansas City • Indianapolis Detroit • New York

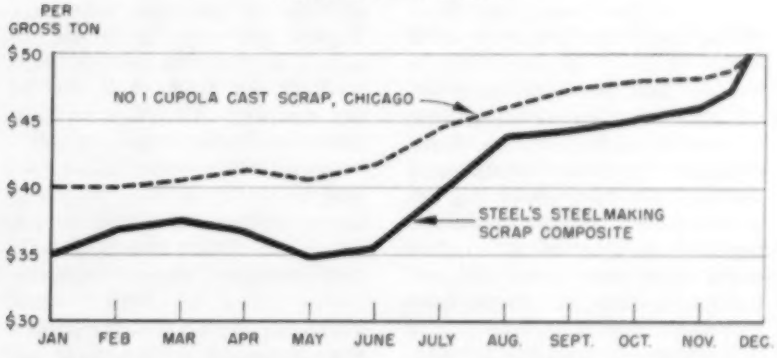
Principal Products: Sheets • Strip • Structural Shapes • Plates • Bars • Tin Mill Products • Rails and Track Accessories • Coal Chemicals

U.S. Scrap Exports

(Thousands of Net Tons)



Prices—1955



What's Happening in Scrap

U. S. EXPORTS of iron and steel scrap are setting a record, but it's not the kind everyone likes. The scrap industry does. Scrap users don't, and their anger is finding expression in a new round of protests to Washington.

Vocal now in a demand that a kibosh be put on scrap exports are foundrymen and nonintegrated steel producers. Early in the year, the complaints were largely from the integrated steel people.

New Record—By year end, our scrap exports will approximate 4,875,000 net tons. Exports in the first ten months (see chart above) total 4,072,774 net tons, and figures for the final two months are expected to show 400,000 tons went out during each. The previous record for a year was 4,533,760 net tons in 1937, when Japan was laying in metallics with which to fight us.

The straw that broke the silence is prices—prices of scrap. Although foundry scrap prices have not risen as sharply as steelmaking scrap (see chart above), foundrymen (and electric furnace steel producers) feel scrap price rises more keenly than do the operators of open-hearth steelmaking furnaces. In open-hearth steel practice, less than half of a furnace charge is scrap. Gray iron foundries use twice as much scrap as pig iron, and electric steelmaking furnaces use practically all scrap.

Complications—Also magnifying the gray iron foundries' problem is their high rate of business. It requires a large volume of scrap. Those foundries will have shipped approximately 14.8 million net tons of castings this year — the best since 1951.

Another thing that hurts foundries is their complete dependence on the open market for scrap. Steel producers (even electric furnace operators) generate a sizable portion of the scrap they use. About 22 per cent of every ingot ton of steel winds up as scrap (croppings, shearings, scale and cobbles). Steel mills also can get production scrap from their customers. No such scrap results from castings.

Percentage Up — This year's scrap exports will be equivalent to 14 per cent of the scrap purchased by domestic consumers. Last year the percentage was 5.8.

Exports, along with high domestic usage and winter's restriction on scrap collection, have boosted foundry scrap prices faster than quotations can be printed. A Cleveland gray iron foundry buyer said the price rise averages $1 a day.

Topsy Turvy—Nevertheless, the rate of increase in steelmaking scrap prices has outrun that on foundry scrap. Ordinarily, No. 1 cupola cast scrap is well above No. 1 heavy melting. The gap now is closed, with STEEL's steelmaking scrap price composite at an all-time high.

High scrap prices might not alarm foundries if they could pass on the higher costs, but foundries must keep products competitive.

The effect of rising scrap prices on companies heavily dependent on scrap is reflected by action by the Connors Steel Division of the H. K. Porter Company Inc. Connors, a Birmingham plant with three electric steelmaking furnaces, raised its steel prices a half a cent a pound a month ago because of increased scrap prices.

Another Case — Northeastern Steel Co., Bridgeport, Conn., a maker of electric furnace steel, revised its pricing of hot-rolled steel strip at the first of November. It tied the base price of strip to the cost of scrap.

Commenting on Connors' price

increase, B. Campbell Blake, vice president and general manager, said: "We are forced into this position without any choice on our part. The increase in the cost of scrap has been brought about by heavy exporting of scrap from the U. S., superimposed on an all-time high in domestic steel producing activity."

Rebuttal—The scrap industry says there is so much more scrap than domestic consumers are using that exportation is necessary to remain in business. Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel, has said the market for dealer scrap has suffered from technological progress in the iron and steel industry. Improved techniques in blast furnace operation, plus the beneficiation of iron ore, have accelerated pig iron production, the metallic competitive to scrap, he points out. And, he adds, increased requirements for sheet and strip steel have contributed materially to an enlarged supply of industrial scrap.

"In view of the narrower domestic market, it is all the more important to channel surplus scrap to friendly foreign nations whose economies are experiencing a boom, too," Mr. Barringer contends. "In this manner, the machinery of collection and preparation by dealers who are so important in the event of a national emergency can be maintained," he explains.

Washington, too, has chosen to believe liberal exports of scrap are best for the U. S.

U. S. Exports (1st 9 mo.)
net tons

1955	
Scrap	3,709,802
Finished Steel	2,609,907
1954	
Scrap	858,701
Finished Steel	1,894,663

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Appliance Sales Whirl

Mass merchandising techniques, built-in kitchens and color will be used to entice the American public into making 1956 another banner year for appliance makers

APPLIANCE SALES will gain 10 per cent in '56. It also will be a year of changes: 1. More independents will join forces to introduce full lines. 2. Color will continue to make its mark. 3. Built-in appliance lines will commence to take a larger piece of the sales dollar.

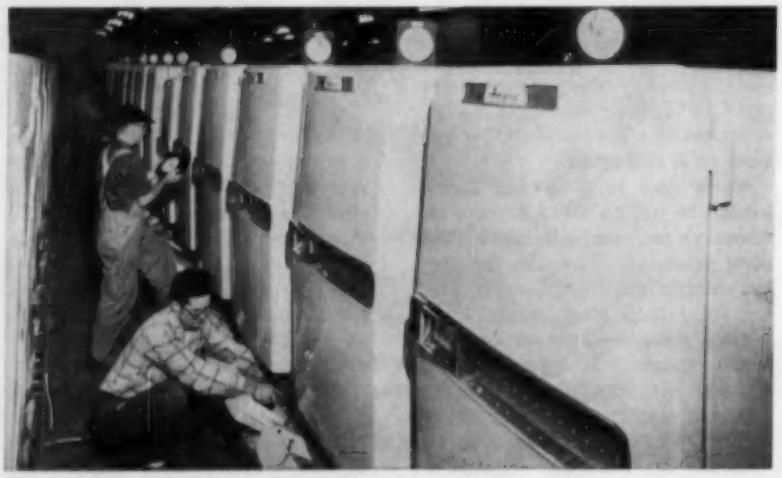
1955 Results — The estimated total for this year shows that all major appliances will gain over last year's shipments (see table). When final results have been tabulated, many of the major appliances will have come close to or passed the record year of 1950. Hottest unit on the market in '56 will be the automatic clothes dryer.

Judson S. Sayre, president, Norge division, Borg-Warner Corp., predicts: "In 1956, the industry will turn out 18.5 million big appliance units." Norge's sales will top $120 million in 1955. Last year's sales were about $74 million. And, says Mr. Sayre, sales will reach more than $150 million next year. Frigidaire Division, General Motors Corp., reports that 1955 sales will be up about 30 per cent over last year and that its entire appliance line will continue to show sales gains in '56.

Bullish Feeling — Some of the reasons for the appliance industry's optimism: 1. Home building will continue to be strong. 2. Family size is growing. 3. Slightly higher retail prices are expected. 4. Many families that bought washers, dryers, etc., several years ago will be entering the replacement market during the coming year. 5. Employment will be at record highs.

George D. Roper Corp. estimates that gas appliance sales will jump at least 10 per cent next year. Roper's gas dryer sales are expected to rise about 30 per cent. And its ace in the hole for '56, say company officials, is an automatic, top-burner range.

Radio, TV — Most experts feel that some 7.7 million black-and-white television sets will be sold this year. While this will set a new industry record, manufacturers are a bit more cautious about next year's results. Consensus: Some 7.6 million units will be purchased. Color television will still be in the limited production category, with appliance manufacturers estimating that between



Amana freezers roll off the production line

Factory Unit Sales Continue To Grow

	1954	1955	1956
Automatic Dryers (gas & electric)	897,751	1,450,000	1,750,000
Automatic Washers	2,352,800	2,750,000	3,500,000
Electric Freezers	975,000	1,000,000	1,000,000
Electric Ranges	1,248,500	1,423,000	1,565,300
Gas Ranges	2,023,200	2,277,000	2,504,000
Electric Refrigerators	3,250,000	4,000,000	4,000,000
Electric Water Heaters	784,500	810,000	845,000
Gas Water Heaters	2,281,100	2,799,000	3,078,900
Household Radios	6,187,503	7,600,000	7,700,000
Television Receivers	7,161,362	7,500,000	7,600,000

Sources: STEEL estimates for 1955, 1956; manufacturers associations for 1954

200,000 and 300,000 color sets will be produced. Pay television will have little or no effect on sales during the coming year.

Radios, Too — The Radio-Electronics - Television - Manufacturers Association estimates that 7.6 million household radios will be sold by Dec. 31. In addition, 6.6 million auto units have been shipped to automakers.

Mergers — More companies are joining forces to present a full line of major appliances. A case in point: The new corporate structure of Whirlpool-Seeger Corp. joins a strong independent laundry equipment maker, a refrigeration independent and the Radio Corp. of America's stove and air conditioning divisions. By introducing combined merchandising, Whirlpool-Seeger hopes to bring full lines to distributors, dealers and consumers.

But independent specialists are still strong. Amana Refrigeration Inc., for example, anticipates that its 1955 production will exceed 1954's by 50 per cent. And by broadening its product line, it will increase 1956 output by another 50 per cent. George C. Foerstner, executive vice president, says: "The opportunities for the independent appliance manufacturer, distributor and dealer have never been greater. It presents us with a great challenge which we want to accept."

Two new freezer-refrigerators will be added to Amana's line for '56, as well as built-in freezers and freezer-refrigerators. There will be an increase in the number of air conditioner models, too.

Color — Westinghouse Electric Corp. indicates that it will introduce something "entirely new" in colored appliances for the coming year. While most companies will continue to develop color lines, it is the opinion of many manufacturers that color units will be used largely to attract attention. A lion's share of appliance sales will continue to center on the consumer's concept of a white kitchen. One manufacturer explains that only 3 per cent of its sales during 1956 will be colored units. Built-ins may hasten the trend to color as about 75 per cent of all built-in kitchen assemblies feature color.

Built-In Trend — Charles K. Rieger, vice president, General Electric Co., states: "People must be made to think in terms of the entire kitchen instead of just appliances." GE will place its emphasis on the built-in kitchen during 1956. Extreme advocates of the built-in kitchen trend are predicting that in years to come built-in kitchens will be traded in for new models. It will be the same as trading in your old car, they explain.

Stainless steel will be used more in 1956. One large appliance maker has indicated that more stainless will be used in its '56 appliance line. Prentiss-Wabers Products Co., producers of built-in ranges and ovens, reports that it will increase its stainless steel order from 250 tons this year to 400 tons in 1956. Reason: Stainless can be used with any color.

The built-in kitchen is making the builder an important individual to the appliance maker. But most companies will still rely on distributors and/or dealers when it comes to getting contracts from builders. Rheem Mfg. Co. reports: "While built-ins have an important place in the builder business, emphasis on the effect of selling complete lines to builders may be overstated. The distributor, when carefully selected and given intelligent co-operation, is still the logical one to work with the builder."

Chester G. Gifford, president, Crosley & Bendix Home Appliances Divisions, Avco Mfg. Corp., presents the composite picture for appliances in '56: "There will be ample opportunity for profits."

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Trouble in Transit

As public transit riders diminish, so do sales prospects for busses, trolleys, subway cars. Regeneration may come when the auto strangles itself on downtown streets

ACF-BRILL stockholders will be asked on Dec. 21 to approve changes which will make food marketing the firm's chief business. Until recently, ACF-Brill manufactured public transportation equipment.

Its problems are typical of those facing public transportation systems and the equipment manufacturers which supply them. Since they hit their peak during the war years, public transit systems have watched their volume drop to half that figure today. Admitting the artificiality of the wartime high, use of public transportation has fallen heavily since prewar days.

Shrinking—Take trackless trolley manufacturers. No coaches were built in 1952, 1953 and 1954. Only 43 were built in 1955. Makers of suburban busses like GMC, Mack and Flxible have seen their market shrink over the same period, despite brighter upholstery, marbleized floors and better riding qualities. With no new subways being built, subway car manufacturers like St. Louis Car Co. find their main business in modernizing existing equipment. And street cars have disappeared from the new equipment scene since about 1950.

Another case in point is GMC. Its whole plant has a capacity of 5000 suburban busses annually and considers about 3000 a standard annual run. This year, the industry's total production of transit equipment will be only about 3500 units. GMC finds itself faced with this paradox: Its share of the market increases but its volume is dropping.

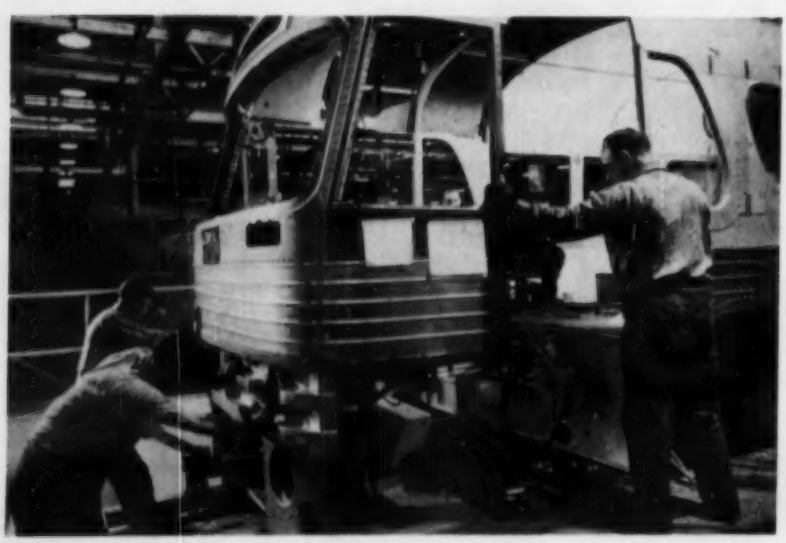
Improvement — What's more, there are only spot signs that the situation is improving or is even static. Vanishing riders pose to transit operators and their suppliers the problem of a continuing diminution of the market in the foreseeable future, as car registrations continue to notch new highs annually.

But the same auto production that's creating the problem may turn into the stimulus for added transit equipment sales one of these days. Congestion in downtown areas of major cities is increasing as transit equipment use diminishes. And there are sound arguments for adopting the American Transit Association's motto, "Move People, Not Vehicles."

Argument—ATS' executive manager, George Anderson, notes that a single traffice lane for public transportation equipment can move up to 40,000 persons an hour, compared with only 2000 per hour in private transportation. The premium costs on road and parking facility expansion in established urban centers lend considerable weight to the case for expanded public transportation.

Meanwhile, public transportation system operators with dwindling revenues wonder how they'll take advantage of the opportunity if it comes. Subsidization of transit systems seems a must, and some see a trend toward legislation of public transportation lanes as an intermediate step to the eventual barring of the general public's autos from the downtown areas.

When that happens, the legislative climate for regeneration of transit activity will come, they feel confident. But until it does, transit people are faced with waiting for the auto to strangle itself on downtown streets.



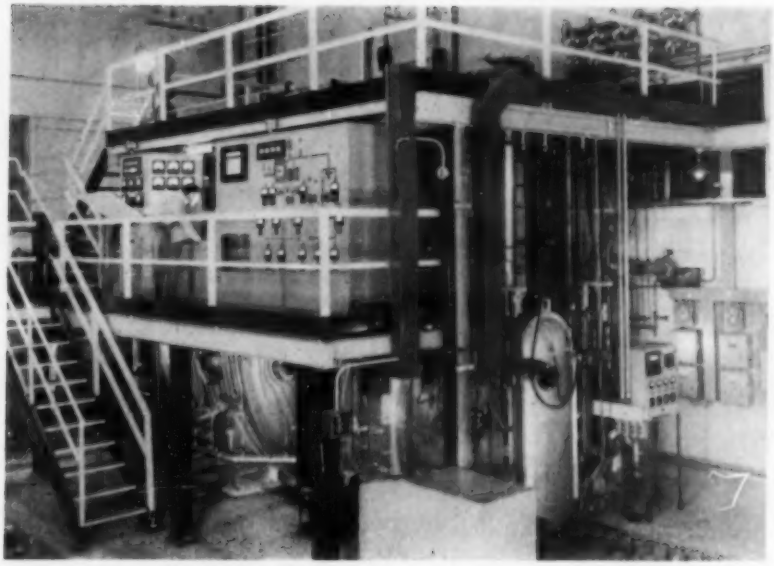
GM gets a larger share of the bus market, but its sales drop

Outlook for Materials Handling

More materials handling equipment will be sold in 1956 than in any other year. That's the message behind a recent address given to the Material Handling Institute by G. E. McNeive, general chairman of General Motors Corp. materials handling activities.

"Increased production and advanced methods mean increased mechanization," said Mr. McNeive. "This will mean more conveyors, more industrial trucks, more equipment—with emphasis on versatility."

Mr. McNeive said that at GMC Truck and Coach Division, 8 per cent of the labor force is engaged in materials handling. GM people, he added, are looking forward to such devices as electronic weighing of loads on industrial trucks and increased use of specified containers and expendable containers.



As Vacuum Metals Corp. taps its largest furnace . . .

Vacuum Melt Capacity Jumps

ANOTHER VACUUM melting furnace has joined the pioneers. It's the largest yet (2200 lb), says Vacuum Metals Corp., which showed it off Dec. 8 at its Syracuse, N. Y., plant.

Although the furnace has been filling orders for several months, the market for 2200-lb (and smaller) vacuum-melted ingots has a lot of growing to do. Vacuum-melted, 52100 alloy steel sells for around $2.25 a pound; air melted, it costs about 25 cents a pound. The big user is the aircraft industry where improved physical properties far outweigh cost.

Potential—Other uses for the superclean, gas-free metal are metalworking rolls for the jewelry industry, vacuum tube parts, stainless welding electrodes and instrument bearings. But they are overshadowed by airframe parts, landing gear and engine bearings.

Jet engine thrust bearings made by New Departure Division, General Motors Corp., got a boost in life from 150 to 1080 hours with vacuum melted steel. "If the same success comes from developmental work on jet turbine wheels, we'll have to triple vacuum capacity overnight," says General Manager James Moore of Vacuum Metals.

Calculated Risk—Such possibilities had a lot to do with the formation of Vacuum Metals by its joint owners, Crucible Steel Co. of America and National Research Corp. National Research designed and built the new furnace, and the earlier 300 and 600-lb units housed in the same building.

The structure is tucked in a corner of Crucible's Sanderson-Halcomb Works, with rolling, forging and drawing facilities next door. That makes the combination an integrated plant, a situation which will take on more meaning if Vacuum enlarges its capacity.

How Much—Theoretically, its capacity is 60-to-75 ingot tons a month. Add a roomful of pumps, piping and remote control equipment to the sketch above for an idea of the complications in making that small quantity.

Here is metal melting to split-hair exactness. The furnace room looks like a chemical plant or power house — anything but a melt shop. The furnace itself is a standard induction type, but housed in a fat cylindrical chamber of ¾-in. stainless steel, covered with copper cooling coils.

Operation—Leading into the chamber is a wheeled conveyor for the mold car, which can carry one 2200-lb mold or several smaller ones. From the time the car enters the gas lock and the lid is closed on the feed hopper, everything happens by remote control.

The sequence of the gas evacuation, charging, melting and pouring cycle is protected by electrical interlocks. Life of the crucible lining is the major factor controlling the number of heats before vacuum must be broken. It requires more frequent replacement than the air operation does.

Eight Attack Pickling Problem

A practical solution to the problem of treating and disposing of waste pickling liquors from steel operations is expected soon.

Blaw-Knox Co., Jones & Laughlin Steel Corp., National Steel Corp., Pittsburgh Steel Co., Republic Steel Corp., U. S. Steel Corp., Wheeling Steel Co. and Youngstown Steel & Tube Co. are cosponsoring the building and operation of a demonstration plant designed to regenerate pickling solutions.

A semicommercial unit, rated at 650 tons of sulphuric acid a year, will be built at Republic Steel's Niles, O., plant. Operation is scheduled for late summer of 1956.

The process will regenerate the entire sulphate equivalent of the waste pickle liquor as fresh sulphuric acid for re-use in pickling of steel. The iron in the pickle solution is recovered as essentially pure iron oxide and recharged to the blast furnaces.

ODM Issues Tax Write-Offs

Almost all the facilities given fast tax write-offs in the latest two-week period were for electric power generation or railroad freight cars, reports the Office of Defense Mobilization.

Twelve certificates were for freight cars (over $140 million). Two went to the Pennsylvania Railroad, one for $53,335,000 and one for $35,000,000. A write-off of 85 per cent was allowed.

New High in '56 Expansion

Businessmen will boost new plant and equipment outlays to a $31.6-billion annual rate next quarter. Spending may go as high as $32 billion for 1956

BUSINESS spending for new plant and equipment, already at a record rate, will be up sharply in the early part of 1956. Reports from the Department of Commerce and the Securities & Exchange Commission put next quarter's spending at an annual rate of $31.6 billion.

The current quarter is running at a rate of just under $31 billion a year. That should bring 1955 outlays up to the same level as the previous record ($28.3 billion in 1953).

Manufacturing—Here's how the first-quarter outlook stacks up, compared with January-March this year: Primary metals outlays will be up 72 per cent; transportation equipment, up 79 per cent; electrical machinery, up 34 per cent; other machinery, up 46 per cent; stone, clay and glass products, up 65 per cent.

Of nonmanufacturing industries, the railroads lead the way. Their spending is scheduled at a seasonally adjusted rate of $1.4 billion for the first quarter. This almost doubles the corresponding period of this year and approaches peak rates of 1951 and 1952. Unfilled orders for freight cars and diesel-electric locomotives have risen fivefold during this year.

Brakes—Not all industries follow the pattern. Public utilities will spend less in first quarter, 1956, than in the current period. Transportation, other than rail, is slowing down.

In commercial industries—trade, service, finance and construction—spending will be somewhat lower.

Conservative—For 1955's July-September quarter, businessmen planned to spend a total of $7.2 billion. They spent $7.4 billion. For this fall, they talked about $7.3 billion. Now it's $8 billion.

Metalworking isn't the only industry that's hard-pressed to meet demand. Rubber, paper and chemicals industries are running at capacity also. If business continues strong, capital spending could end up as high as $32 billion next year.

Kaiser May Expand

"The possibility of a major expansion in our steel producing and steel rolling facilities at our Fontana plant" is being studied, stockholders of Kaiser Steel Corp. were told by Henry J. Kaiser, board chairman. He pointed out that western steel mills produce only about half of the steel used in the area.

At the stockholders meeting in Oakland, Calif., Mr. Kaiser said, "We recognize that one of our obligations to our customers and to industry in the west is to continue to produce more and more steel to meet the growing demands.

Stockholders were informed that every sign points to capacity operations for Kaiser Steel as far as can be seen into 1956. (Capacity at the Fontana mill is 1,536,000 ingot tons of steel a year.)

Mr. Kaiser said purchases this year of vast coal properties in Raton, N. Mex., and a high-grade limestone deposit at Cushenbury, Calif., have given his company "the strongest position on raw materials of any steel company in the nation in relation to size."

Northwestern Adds Bar Mill

Another 16-in. merchant bar mill will be added to finishing facilities by Northwestern Steel & Wire Co., Sterling, Ill.

Construction of the continuous mill (due to start soon after Jan. 1) will permit rolling of heavier sections. Completion of the unit is scheduled for late summer.

New Plant and Equipment Spending Gains

(annual rate: billions of dollars)

	1955					1956
	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.	Annual	Jan.-Mar.
All Industries	$25.65	$27.19	$29.65	$30.86	$28.33	$31.60
Manufacturing	10.17	10.84	11.97	12.64	11.40	13.44
Durable	4.78	5.06	5.77	6.23	5.46	6.80
Nondurable	5.39	5.78	6.20	6.41	5.94	6.64
Mining	0.80	0.80	0.99	0.97	0.92	0.95
Railroads	0.74	0.80	0.96	1.15	0.91	1.41
Transportation, other than rail	1.46	1.62	1.60	1.66	1.58	1.64
Public Utilities	4.01	4.09	4.43	4.70	4.30	4.52
Commercial and other	8.46	8.90	9.70	9.74	9.20	9.64

Sources: Securities & Exchange Commission and Commerce department

Capital Expenditures Pittsburgh Area

(In Millions)

1955	$192.6**
1956	265.2**
1957	164.5*
1958	152.8*
1959	109.4†

University of Pittsburgh survey. Companies reporting: †49 *58 **60

From business district to industrial areas, the Steel City grows

Big Expansion in Pittsburgh

CAPITAL SPENDING in the Pittsburgh area will increase 37.6 per cent next year, according to a survey by the Business Research Bureau, University of Pittsburgh.

Reports the bureau: "In four Pittsburgh-area counties, 60 companies will spend $265.2 million in 1956, compared with their expenditure of $192.6 million this year. The boom in capital spending may well run into 1957."

Looking Ahead—The 60 firms expect to invest 50 per cent of their 1956 expenditures on expansion; the rest will go for replacement and modernization. In 1955, only 25 per cent of the total was allotted to expansion. Some $164.5 million already has been set aside for 1957 expenditures, 50 companies report.

Donovan Wilmot, vice president in charge of product sales and distribution, Aluminum Co. of America, Pittsburgh, adds to the optimism. He reports that aluminum consumption is outstripping the pace of U. S. industrial growth, while other nonferrous metals have lost ground in relation to that yardstick.

"This year, domestic production of primary aluminum is expected to reach 1.6 million tons, and next year's production should be still higher," Mr. Wilmot predicts.

More Growth — Best news for steel fabricators is word that 14 iron and steel companies in and around Pittsburgh plan to spend $105.3 million for plants and equipment in 1956. This year, those firms spent $48.2 million for new production capacity.

Iron and steelmakers report spending 18 per cent of their 1955 capital-expenditure budget for expansion. Next year, it will be 46 per cent. U. S. Steel Corp. is not included in these statistics.

Rounding out the picture of industrial growth in Pittsburgh are reports that four electrical machinery manufacturers will double expenditures in 1956. Two nonferrous companies will spend $4.1 million next year, compared with $3 million this year.

Study Shows Profits Sag

Profit margins for metalworking companies have slipped during the last five years, a study by Commercial Discount Corp., Chicago, shows.

On sales for metal stamping plants, for example, the study shows that net profits have dropped from 6.5 per cent in 1950 to 3 per cent this year. Old equipment, larger inventories and slower collections from customers are reasons for the decline.

About 58 per cent of metalworking equipment is at least 10 years old; another 21 per cent is 20 years old, the study reveals. Older machines are a competitive handicap for many firms because they are almost a third less productive than newer models.

Inventory costs also have increased—from 65 per cent of working capital in 1950 to 80 per cent today. In the same period, average collection time for outstanding accounts has slowed from 31 to 39 days.

To meet this problem, Commercial Discount Corp. has been working on a threefold experimental financing plan. It provides cash for new equipment, finances larger inventories and lends money to pay current bills.

In operation for two years, the experiment has helped 12 metalworking companies modernize their plants and cut costs, thereby raising profit margins. Commercial Discount is offering the plan to other firms.

Industry committees help OMM check the supply of . . .

Minerals for Defense

A LONG LOOK at the nation's supply of mined ores and minerals is being taken by Office of Minerals Mobilization.

The mission: To "inventory" our mineral resources and come up with a long-range policy to insure continued supply and production in case of war. If there is no war, the program is expected to bring peacetime economic benefits stemming from stimulated exploration, research and development of substitute materials.

Influence—While not able to take direct action, OMM can influence decision-making on expansion goals and expansion programs and give advice on financial incentives to overcome shortages of capacity or supply. As one official put it: "We're developers and recommenders." Final say-so on the recommendations is up to Congress or ODM.

One of OMM's first steps in its look at mineral resources was establishment of 14 industry advisory committees. First meetings of seven committees were held during the last two weeks; the remainder are scheduled after the first of the year.

Industry committees have been set up for studies of aluminum, antimony, asbestos, beryl, chromite, columbium-tantalum, copper, fluorspar, lead, manganese, mercury, mica, tungsten and zinc.

Points that OMM hopes to develop from the meetings: What are the capabilities of the domestic industry? How much can be produced? At what price? Under what conditions? To what extent can we depend on foreign sources? What are chances of developing low-grade domestic sources?

Recommendations—Possibilities that could develop after information gathered at the meetings is analyzed:

1. New expansion goals accompanied by fast tax write-offs.
2. Stepped-up search for new mineral deposits and development of new properties.
3. A look at taxes affecting discovery and production of minerals to see if they are holding back sound development of our resources.
4. More financial assistance to private industry for exploration.
5. More government minerals and metals research aimed at developing latent resources and new mineral raw materials.
6. A stand-by setup to assure machinery, power, transportation and maintenance supplies will be available to the minerals industry in wartime.

But as the man said, OMM can't do any more than recommend.

DOD Plans Boston Confab

The Defense department will put in another plug for industrial preparedness at a program for New England industrialists Jan. 10 in Boston. It's particularly aimed at businessmen who aren't doing defense work now but would be in wartime. Topics include industrial mobilization, lay-aways of industrial equipment and keeping up the mobilization base. Interested executives are asked to contact the New England Council for Economic Development, Boston.

Draglines Speed Seaway

About $7 million worth of contractor's equipment is in use on the St. Lawrence Seaway. Most impressive are three big draglines which are worth more than $500,000 at today's prices. The big machines are one of the reasons work is ahead of schedule on the canal. Rugged excavating problems have caused work in the lock area to lag.

Meet John V. Burley: Director of Business & Defense Services Administration's Iron & Steel Division. On loan from Republic Steel Corp., Mr. Burley will serve six months with BDSA. In Washington he can be reached at Room 4812, Commerce Bldg. Phone: STerling 3-9200, ext. 4412.

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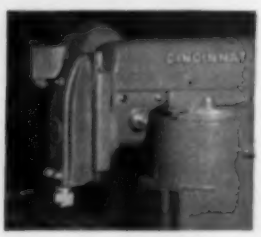
. . . master of your small- to medium-size tool and die work

NO. 1B CONTOURMASTER MILLING MACHINE

Contourmaster, a new die sinking machine developed by Cincinnati Milling, is a member of the world's greatest family of hydraulic tracer controlled machine tools. The new Contourmaster is built in two styles, 1A and 1B, differing primarily in table size and location of handwheels. Both styles are equipped with Cincinnati Hydraulic Automatic Depth Control, which operates from a few ounces of contact pressure . . . three-dimensional positioning of tracer mechanism . . . ram mounting of spindle carrier for increased cross range. Many cost-reducing features are combined in this great new CINCINNATI . . . the Contourmaster . . . master of all small- to medium-size tool and die work. Get the complete story by writing for catalog No. M-1919.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

Automatic Hydraulic Depth Control Unit, standard feature.



Shaping Attachment, mounted on rear end of cross ram, extra equipment.

Spindle head and tracing mechanism may be swiveled as a unit about a pivot point which approximates the cutting end of the cutter.

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MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

D. T. Peden: Prowling for New Jobs

HE WORKS for people who *aren't* his customers. Douglas T. Peden, vice president of research and experimental, Micromatic Hone Corp., Detroit, specializes in studying jobs where honing isn't used, but could be. His object: Set a wider swath for "low-volicity abrading."

Mr. Peden feels his company has been doing a big missionary job on the whole subject of what honing is and what it will do. His approach is to take parts which are not being honed, find out what the method can do. This may mean setting up a pilot production line in his laboratory. "When we know what we can do, we show it to the potential customer. It's up to him to decide if he wants it."

Open Mind—One requisite for the job: A set of lithe concepts on what can be done. Sometimes, even the fundamentals turn out to be wrong.

For example, honed surfaces have been immune to chatter, vibration and minute misalignment because the tool floated free on universal joints. This was a highly touted virtue of the honing method.

Answer—Then came the problem. With a floating tool, how could you hone a hole and be sure its center line was exactly square with an end face? The answer came when the "float" precept was discarded. Now, with what he calls "rigid honing," the tool is not allowed to float, but is locked in position on the spindle. Guided by the rugged spindle, the honing operation finishes bores with amazing precision.

Other products of his lab include spherical honing of both ID's and OD's, new stone shapes and a vast array of automation that has moved honing into the mass-production business.

Background—Mr. Peden left Albion College to go with the old Hayes Wheel Co., where he became chief engineer. From there he went with the Oakland Motor Car Co. (now Pontiac Division of GM) and specialized in tool engineering. He says he's had a liberal education with radio, tool and die and auto companies.

He joined Micromatic in 1938 and worked almost directly into development and experimental projects, his first love.

He has a son and a daughter. His hobbies are tinkering with his cars, tending the lawn and painting and puttering around the house.

British steel mills run at capacity

Boom in Europe—

Britain . . .

HOW CAN anybody buy anything? That was Britain's anguished reaction to Rab Butler's interim budget in October this year.

It's exactly what the chancellor of the exchequer was looking for. The October measure was the third effort this year to curb domestic buying, and force more output onto export marketa. It should succeed. Purchase taxes on radios, TV sets, automobiles and other consumer hard goods were boosted to 60 per cent. On luxury items, the tax soared to 90 per cent.

Why—By third quarter, it was apparent that previous measures weren't strong enough. Australia had reduced her imports from Britain; more goods were diverted to the domestic market. Consumer credit reached an all-time peak in July. In the same month, rail and dock strikes combined to drop exports to $439 million, the year's low.

Through the year, Britain had to import 1 million tons of steel, much of it from the U. S., to keep industry going. Her coal mines have lost 6000 workers in the last nine months, and with them 3.5 million tons of coal. Her coal import bill has reached $130 million, from just $16.8 million last year. Again, much has come from the U. S.

Paradox—The auto industry, Britain's brightest export star, has contributed to the imbalance. Steel imports have included some 30,000 tons of sheet a month, most of which has gone to autos. As in the U. S., high auto production has put other industries under heavy pressure. Auto output is up 20 per cent from 1954, to about 1.2 million units. Of these, 50 per cent will be exported, bringing in some $571 million.

Steel production should hit 22.1 million net tons, 10 per cent up from 1954. But for the midyear rail strikes, when plants lost as much as a month's output, production would be closer to 22.5 million tons. Most of the plants have been running 24 hours a day, seven days a week. But order books are full through the first quarter of 1956. Since the war, productivity has been boosted 60 per cent, while employment is up only 12 per cent.

Squeeze—In many fabricating industries, there's a similar story. Production is just as high as labor and materials will permit. Restrictions on industrial building have been lifted to encourage new capacity, and railroad development and colliery mechanization have been piled on the top to squeeze structural steel supplies tighter than in the U. S.

Drop forging has had its best year. The machine tool industry has run about 15 per cent higher than in 1954, but order books have been extended up to two years. This will have a direct effect on export sales, where fast delivery has been a major sales pitch.

Looking Ahead—In ship building, some work is still held up by a shortage of plates. However, by the end of September, one-third of the world's new tonnage (2.1 million tons) was in British yards. This included some 79 tankers. A new order for $33.6 million in steam turbine tankers has since been placed.

Most metalworking industries are planning expansions. In the next five years, steelmakers will add some 4 million tons of ingot capacity, 3 million tons of blast furnace capacity, 2 million tons in strip mill capacity and new sinter, ore handling and supplementary fa-

cilities. Railroads are starting on a 15-year dieselization program. They will spend $3.7 billion for locomotives, passenger and freight cars, track and signals.

Trade, Not Aid—U. S. aid is helping Britain solve one of her most important problems—expansion capital. Automakers will invest $344 million by 1960 to boost output to 1.5 million units. About $280 million of this is being spent by Ford and Vauxhall.

American money is helping Britain with her balance of payments problem, too. Offshore procurement of airplanes, radar and other military equipment is still heavy.

Investment — More permanent, the value of direct American investment in Great Britain has more than doubled since 1945. It stands at about $1.2 billion. In 1955, American-controlled plants will produce more than $1.5 billion worth of merchandise—chiefly office machinery, agricultural machinery, industrial instruments and refrigerators.

Prewar, the United Kingdom had to import about 70 per cent of its limited take of these products. It now exports about 30 per cent of its output. Britain has become the world's second largest exporter of agricultural machinery and tractors. Since British costs of production run some 10 per cent below those in the U. S., prospects are that the investment trend will continue to accelerate.

Outlook—For Britain in 1956, the big question is: Will the labor force keep on producing when it is denied the chance to buy? As one British fastener manufacturer told STEEL: "We were shooting for a 50-per-cent boost in sales next year; now, we'll just have to wait and see."

Spain . . .

WHAT does it take to build up a country which still uses locomotives that were running in 1858, that has a steel industry which produced more in 1929 than in any year until 1954, that has many people who still use produce rather than money for exchange?

That's the job that the U. S. has shouldered in Spain, in return for an air base network.

Aid—The first $85 million in Foreign Operations Administration money has been spent. It went for steel, electric power, railroads, highways, civil aviation, irrigation and dams, cement, coal and agricultural equipment. In fiscal '55 and '56, $58 million will be spent.

Steel capacity will be increased to 1.5 million tons in 1956, 1.8 million in 1957 and 2.1 million in 1958. A new, fully integrated government plant will be constructed at Aviles. Its equipment will include a 400,000-ton reversing mill bought from McLouth Steel Corp. in Detroit; a Davy-United blooming mill, capable of rolling over 2000 tons a day; a Linde-Frankel oxygen plant; a Wean continuous pickle line; Lee-Wilson reheating furnaces; and Wean shear and cutting lines. One of its two blast furnaces will come from Head-Wrightson, an English affiliate of Arthur G. McKee & Co., the other from Koppers Co.

Resources—Spain's other principal steel plants are Altos Hornos de Vizcaya, Sociedad Metalurgica Duro-Felguera, Sociedad Anonima Basconia and Echavarria. They have no coal or iron ore problems. In 1954, 1.6 million tons of iron ore were consumed, and Spain exported a further 2.2 million tons.

But Spaniards are short of scrap. Little is produced at home, and imports are hampered by foreign currency difficulties. The Aviles plant will be completely self-sufficient as far as scrap is concerned.

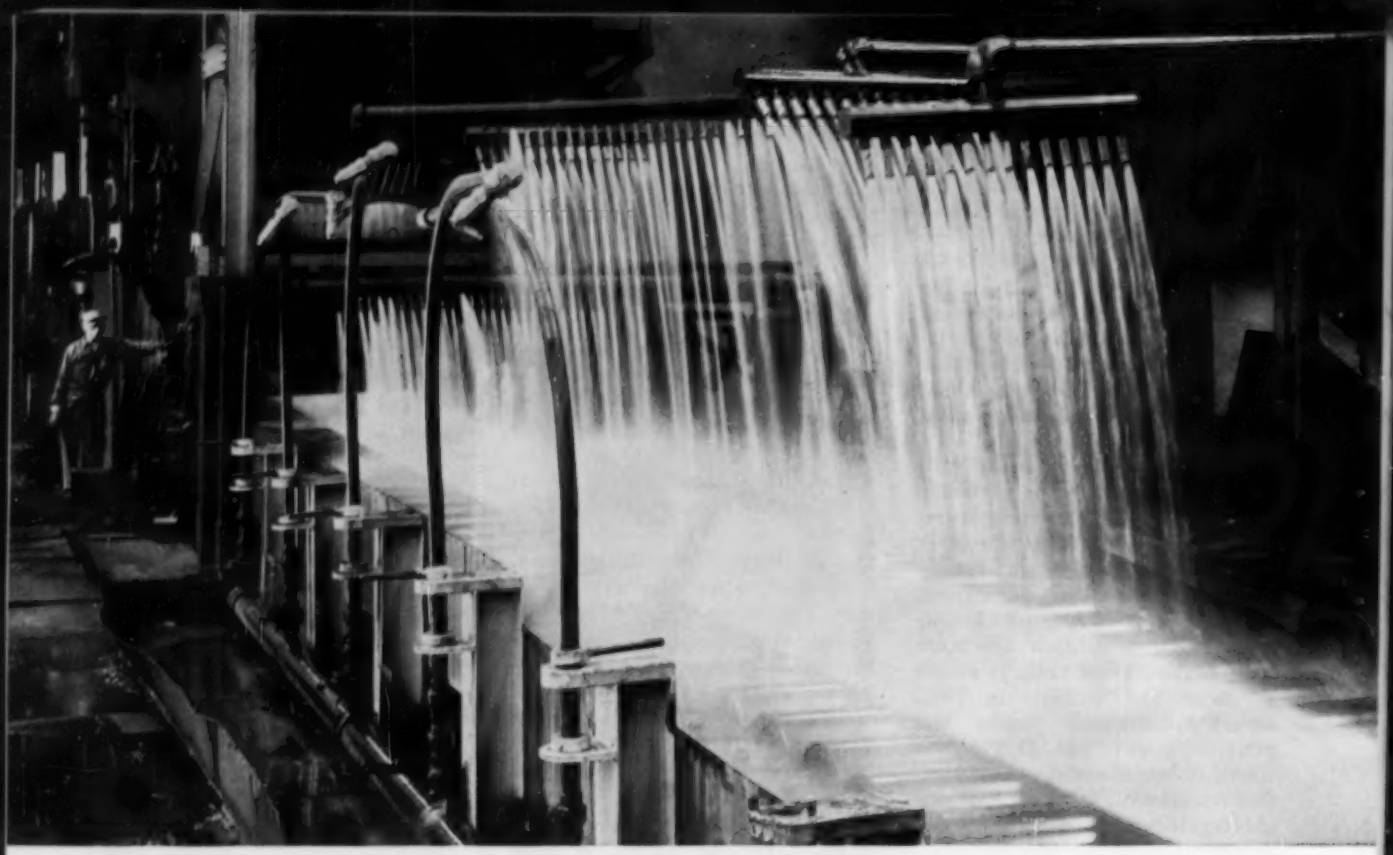
Air Bases — Contracts worth $11.6 million have already been let for some of the airport work. The 485-mile pipeline (welded steel tube 10 in. in diameter), carrying petroleum, oil and lubricants to the fields has been started. The total cost of the program is estimated at $310 million. The supervising American contractor is Brown-Raymond-Walsh.

This dollar inflow will help lessen some of Spain's burdens. But there's still a long way to go. Though new steam generating capacity has come in, 78 per cent of Spain's electricity is hydroelectric, and depends on an unpredictable water supply. Much metalworking machinery dates to the beginning of the century. Inflation is built into the economy and foreign trade position is weak.

Progress will be made, but even with U. S. help, it will be slow and painful.

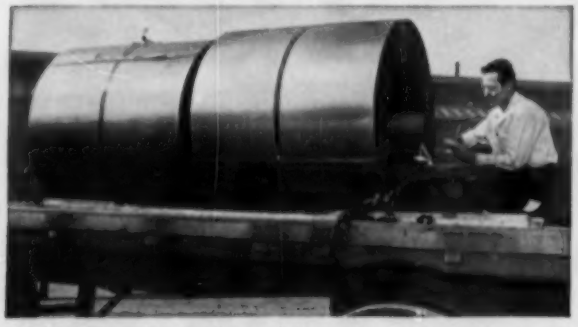
These articles continue a series on the economic outlook in major European countries. Next week we will cover the over-all picture

Spanish crews work on the POL line (petroleum, oil and lubricants), which will service U. S. air bases. The line starts at Rota, a Spanish Port across from Gibraltar and runs to Zaragoza in northeast Spain



How Great Lakes Steel *sprays* for quality

Left: The Olson Ductility Test is performed in one of the metallurgic laboratories. *Right:* A tensile test is made at the Quality Control Department's main lab. These are two of many checks to assure correct grain and hardness.



Quality of product and complete service to the customer are behind every sheet, coil and bar from Great Lakes Steel.

Our customers control this water!

Why? Because our customers' specifications determine the temper and grain structure of each shipment. These are achieved, in part, through control of the water that hits the red-hot strip as it races from Great Lakes' 96-inch continuous mill.

Temper and grain structure are among the many characteristics of steel strip and sheets that can make your production efficient and your product profitable. That's why the steel you order is so important to you—why your order at Great Lakes receives individual supervision *through every stage of production.*

Our knowledge of steel and steelmaking may be able to contribute importantly to your production and your product. A call will bring a Great Lakes representative to talk over your requirements.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Here's the Golden Hawk, top model in Studebaker's sports car line

Experiment in South Bend

AMERICAN AUTO styling has many critics who have one thing in common: None of them has to sell cars.

Studebaker was approached by one such gentleman back in its bachelor days when the Italian automotive lovelies were much touted. His idea was production of a limited volume machine that handled and performed like good little sports cars do. But above all, these thousand or so units a year would be styled in a manner to make the Italian offering look like so much pizza filling.

Tempted—Studebaker was taken with the look of these machines. Noted for styling innovation like the postwar "which way is it going" car and its successor, the airplane front, Studebaker figured the design was just what it needed to intensify the limelight. And on that score Studebaker was entirely correct.

Not soon to be forgotten among public relations men is the space which Studebaker notched in periodicals with its 1953 models. The flood of customers into dealer showrooms just to see pictures of the cars and later sample models made many an automaker with dusty "immediate delivery" competitive makes cringe. But the tide of interest was ebbing before the cars arrived in quantity. To this day many wonder what the story might have been had Studebaker been able to capitalize on the original impact.

Neither, Nor—As the story is, Studebaker found itself with a limited-appeal car competing in a volume market. Those attracted to the car by its styling discovered that looks are no more useful than advertising copy at a traffic light. It was a machine which was only potentially a sports car in the eyes of enthusiasts and questionably a passenger car in the eyes of the stiff-jointed masses. And those who bought it did so because it was close to both, while achieving the norm of neither.

That is the background of Studebaker for 1956. In recognizing the dual nature of the demand it was trying to serve with one car, the division of Studebaker-Packard Corp. reasonably concluded that two lines competitive in their fields were required. The result is two separate and distinct types of car, the Hawks and the "Look-Big" passenger cars.

Speed—But the thing that makes this story strictly from outer space is the speed with which the move was accomplished. In October of 1954, officials began working on the product for 1956. It was to go into production just one year later. Studebaker styling felt it lacked crispness, had too much slope in hood and rear deck. Many who did like it recognized the need for interest points on the front and rear.

With these data in hand, officials went to work. Renderings of the new "look-big" car line to meet the more conventional market were

ready in December—just about the time other companies were working on die models for their 1956 jobs. A clay mock-up of the car was made in an isolated red brick building. Then one of the most unusual stories in the modern auto industry unfolded.

Brainstorming—Using the brainstorming technique of tossing out ideas at random, a group of about eight men, under direction of Roger E. Bremer, vice president for purchasing and planning, translated the rough design into a production model. Normally, this job of conceiving the product, guiding the cost input of manufacturing and following up to see that the objectives can be met, occupies many committees of that size for more than a year. In this case, the final clay version of the car was ready in April of this year, only about four months later.

A big asset in doing the job was the immediate recognition by the group that the body lent itself perfectly to the type of major remake required. Their attention thus could be directed to the front and rear end treatments required and the picture on this page shows the result. But some of the things the picture does not show are ways in which money was saved by brainstorming the design.

Short Cut—Take bumpers. By moving the guards on the front bumper outward, the basic appearance of the area was changed to one of greater massiveness, though the bumper itself was unchanged. Examination of the rear bumper situation revealed that by cutting the ends off them and adding a boot on each side, the rear end effect of many high-priced cars could be achieved. Saving: The $250,000 cost of new bumper dies.

Here's the President Classic, Studebaker entry in the conventional field

The brainstormers worked on the interiors. Lines and materials were selected to give a more massive feel to the interior, enhancing the effect of the larger exterior appearance. And so well have they done their job that few seeing the car recognize portions from the Studebaker of 1955.

Hawk—More recognizable, however, are the Hawks (see page 61) which comprised the second part of the product program. When the conventional model line was priced out, about $1 million was available to change the Hawk for 1956. One immediate deficiency was in the performance department, which was quickly and emphatically solved by dropping the Packard power plant into the big job. This feat was made handier by the feeling that the hood slope was too great and the new hood pictured was created. Its Lancia-like grille gives a front-end highlight that is desirable and also solves some clearance problems that might have been encountered.

Parking lights are placed atop the front fenders to further the raised feeling, and the rear deck also received a raising treatment. Perhaps the greatest bit of ingenuity comes in the new rear fender fins. With no time and a limited budget, the committee decided to try Fiberglas fastened to the steel fender.

Plastics—Engineering developed a method of fastening the Fiberglas section to the fender. Molded Plastics in Ashtabula, O., long associated with the Corvette, was commissioned to build the part. Anchored both with adhesive and a molding, the part has accomplished the same effect as a completely new rear quarter panel at one-fifth the cost and in much less time. There is little doubt that this technique (facelifting which changes the sculpture of the car at minimum cost and at great savings in time) is headed for rapid growth in the industry.

Perhaps most significant benefit of all, incidentally, is the freedom from formability problems.

Experience—Studebaker is frank to admit that it is interested in getting experience in Fiberglas. Next year, the prototype tooling in plastic and kirksite will be used to run volume parts in conjunction with conventional tooling for further experience in this medium. Fiberglas promises to play a key role in the future of the corporation, both as tooling and structural material.

Studebaker today has a backlog of 36,000 cars since its early December introduction. This is termed the "biggest bloom of success greeting a Studebaker announcement since 1950," by Studebaker division manager, Harold E. Churchill. All this goes to show what you can do with a brainstorm properly directed.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,669	236,635
November	748,559†	508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Nov. 12	180,754	116,285
Nov. 19	179,250	133,969
Nov. 26	151,799	111,910
Dec. 3	177,712	144,995
Dec. 10	181,829†	148,692
Dec. 17	178,500*	151,924

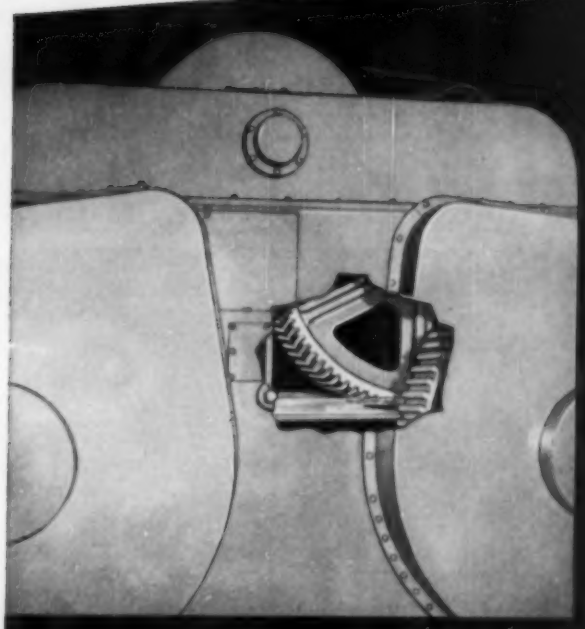
†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

These are the features that make -Verson- presses your best buy

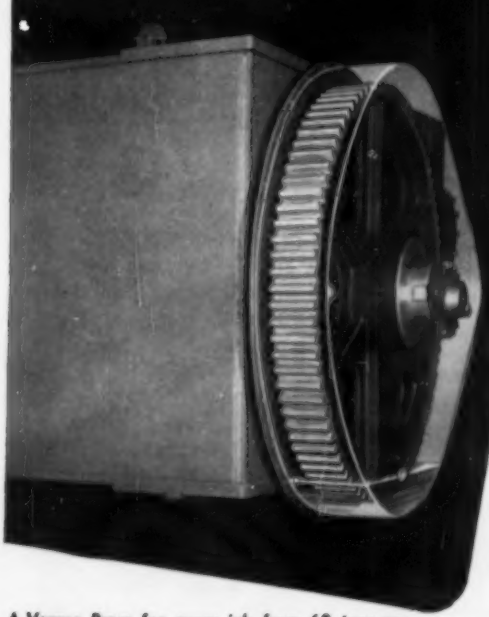
DRIVE GEARS

operate in oil bath to assure long life and smooth, efficient operation with

-Verson- PRESSES



Cutaway showing how herringbone intermediate gears operate in oil bath within the crown.



Cutaway showing Verson main gears and the oil bath in which they operate.

As the cutaway views at the left show, drive gears in Verson presses are fully enclosed and operate in an oil bath.

This is the positive way of insuring effective lubrication. Each tooth of the gear passes through the oil on each revolution to pick up its protective film of oil. For the press user, it is the kind of protection that means smooth, efficient operation throughout a long, trouble-free life.

Gears operating in oil is just one of the many advantages built into Verson Presses to give the user more and better stampings at lower overall cost. Whether you require a single press or an entire stamping plant complete with tooling, be sure to get the whole story of what Verson quality can mean to you.

For specific recommendations, send an outline of your requirements.

Catalogs are available describing the Verson lines. Please write for yours, mentioning the types of presses in which you are interested.

A Verson Press for every job from 60 tons up.

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ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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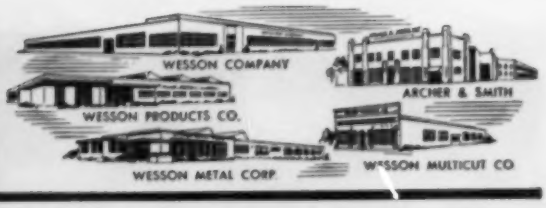
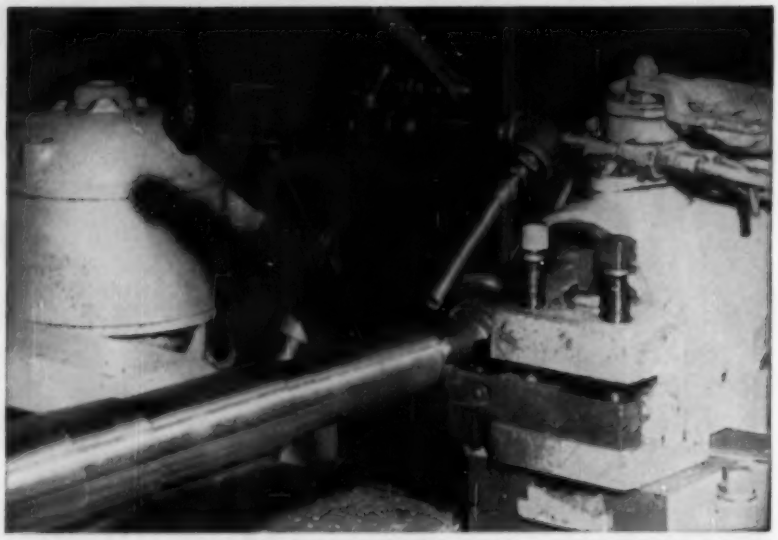
MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

carbide NEWS



26 Outperforms Other Carbides 8:1

Boosts sprocket shaft output from 15 to 120 pieces per grind



In a series of production comparison tests, Grade 26 again came out on top—this time in machining forged steel (Rockwell 44) tractor sprocket shafts at a large midwestern tractor company.

With Wessonmetal 26, output averaged 120 pieces per grind as compared with 15 pieces per grind for all other steel cutting grades tested.

The operation is performed on a new 20" Monarch Air Gage Tracer lathe and consists of finish turning the shaft diameter, forming radii and chamfers, and rough turning all other diameters. Length of travel in the cut is 18¼"; speed 375 sfpm; feed range from .009 to .012". Average depth of cut for all diameters is ¼-inch.

Primary reason for the big increase in life achieved with Wessonmetal 26 is its ability to stand up under widely varying conditions. Inserts made of other carbides shattered or broke after 12 to 15 pieces on one cutting edge and could not be indexed. This trouble was eliminated with Grade 26, which averaged 20 pieces per edge and could be indexed to give a total of 120 pieces per grind.

Worthy of note also is that the performance of Wessonmetal 26 (a "nearly universal" steel cutting grade) was achieved in comparison even with carbides of a specialized nature specifically selected for this operation.

New Film Points Way To Better Tooling

One of the most dramatic technical sound films yet produced is now released by the Wesson Company for showings to technical and shop groups.

Built around the development of tooling for an actual job—the machining of tractor track links—the 16 mm. technicolor sound film—which took two years to complete—records the *failures* as well as the successes achieved. The trials and tribulations encountered will remind many of their own experiences.

Entitled "Tools of Abundance," the film tells how a large manufacturing committee working with Wesson tool engineers carried a specific job through to completion. It is the story of how cooperation helps to develop and improve American manufacturing methods.

This story of teamwork—supplemented by about a dozen other general machining and high production operations in the film—provides a rational approach to solving other difficult tooling problems. For a showing to YOUR company, write for the film on your company letterhead. A Wesson man will bring it to you.

tools Wesson carbide Wessonmetal

WESSON COMPANY
DEPT. AD
1220 Woodward Heights Blvd.
Detroit 20, Michigan

Tool Hints

If you have an idea that you would like to get better tool life on a job than you are getting, do these things and you may find you were right:

1. Check for vibration and chatter and eliminate all you can. Both are deadly to tool life.

2. Check whether the rake angles are correctly ground. There is a best combination for any job.

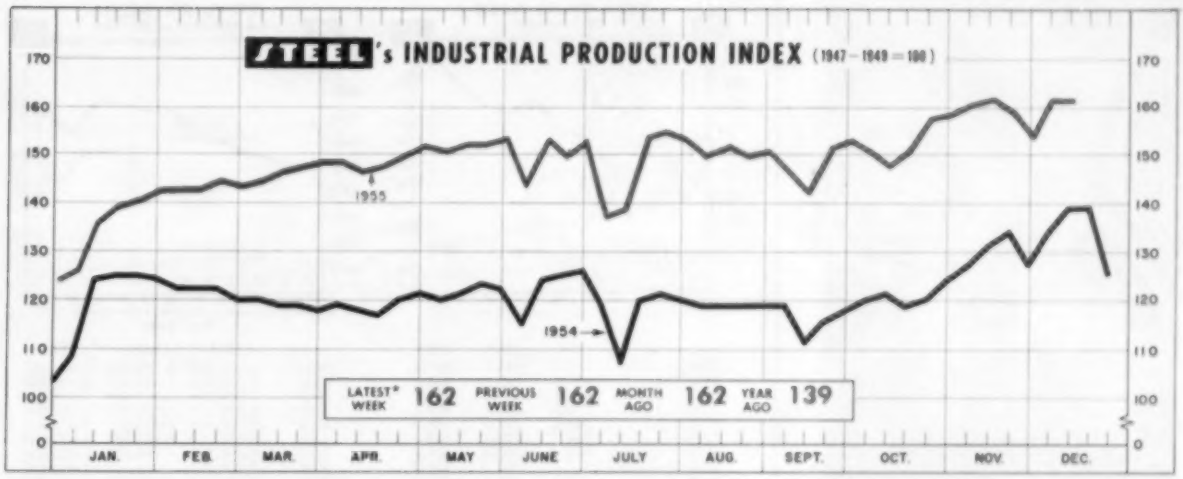
3. Check whether you have the ideal combination of speed and feed.

4. Check whether tools are changed before they get too dull. Dull tools wear faster than sharp ones. Keeping them at work is false economy.

5. Check tool after each sharpening against the tool PRINT. This is excellent insurance.

None of these suggestions are new. But they are still keys to better tool performance.

(P.S.—A sixth method is to call in a Wesson man)



*Week ended Dec. 10. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Backlogs Insure High First Quarter

BIG BACKLOGS are positive insurance that business will be bright right through the first quarter of next year and well beyond.

The Commerce department shows that manufacturers' unfilled orders (unadjusted) rose from $53 billion to $53.3 billion between September and October. A year ago, this index stood at $47.4 billion. "Most of the backlog increase came in machinery and transportation equipment," explains the Commerce department.

Freight Cars—One item customers want is freight cars. Delivery backlogs have risen steadily since midyear—the most recent figure is 61,954. From the looks of things, backlogs will continue to rise as carbuilders work feverishly to keep up with the growing demand for more transportation.

Backlogs are probably highest in basic materials. Duplicate orders may have built up backlogs in some cases, but manufacturers will take all they can get from any source.

Structurals — Typical of the basic material backlogs is fabricated structural steel—long in demand and short in supply. October backlogs hit 1.9 million tons, a steady rise since last year when they were 1.3 million tons. Monthly shipments, on the other hand, have slipped from 289.1 to 283.8. This situation won't improve much. Construction, currently in a dip, still needs more structural steel than it can get. That item shows no immediate signs of easing.

Middleman — Industrial supply houses indicate there are enough finished goods to go around. Lead times have increased over '54 periods, however, because of tighter material supplies.

One Cleveland supply house says its delivery time has increased 30 to 60 days over last year. In 1954, customers could get delivery on most finished products in two weeks. Now it takes a month and a half to two and a half months.

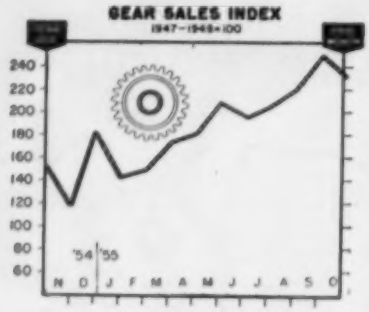
Peak Capacity—As businessmen

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,397[1]	2,416	1,950
Electric Power Distributed (million kw-hr)	11,300[1]	11,359	9,612
Bitum. Coal Output (1000 tons)	10,460	9,030	8,500
Petroleum Production (daily avg—1000 bbl)	6,800[1]	6,836	6,286
Construction Volume (*ENR*—millions)	$330.3	$278.8	$258.3
Auto, Truck Output, U. S., Canada (*Ward's*)	217,290[1]	213,506	176,075
TRADE			
Freight Car Loadings (1000 cars)	710[1]	728	662
Business Failures (Dun & Bradstreet)	203[1]	209	221
Currency in Circulation (millions)[3]	$31,070	$30,962	$30,697
Dept. Store Sales (changes from year ago)[3]	+3%	+10%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$21,580	$17,984	$19,979
Federal Gross Debt (billions)	$280,189	$279,866	$278,853
Bond Volume, NYSE (millions)	$21,222	$17,978	$27,302
Stocks Sales, NYSE (thousands of shares)	13,093	12,490	18,506
Loans and Investments (billions)[4]	$85,310	$85,369	$85,783
U. S. Govt. Obligations Held (billions)[4]	$29,643	$29,961	$37,106
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	268.3	265.9	217.3
All Commodities[7]	111.1	111.1	109.5
Commodities Other than Farm & Foods[7]	119.3	119.2	114.5

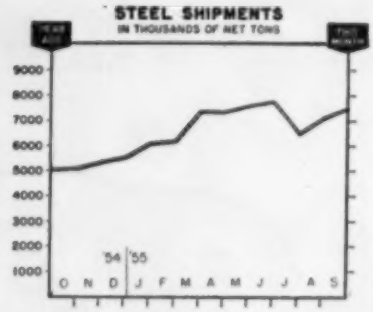
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1926-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

THE BUSINESS TREND



	1955	1954	1953
Jan.	140.9	167.4	161.4
Feb.	148.5	165.1	188.1
Mar.	172.8	128.6	158.9
Apr.	179.8	158.2	217.1
May	205.2	132.5	189.8
June	193.5	127.4	146.5
July	201.7	141.3	120.7
Aug.	217.6	154.7	121.6
Sept.	227.6	135.1	135.6
Oct.	....	152.3	211.1
Nov.	....	116.7	144.9
Dec.	....	182.2	194.0

American Gear Mfrs. Assn.



Net Tons

	1955	1954	1953
Jan.	6,009,958	5,727,600	7,067,636
Feb.	6,119,900	5,364,978	6,533,227
Mar.	7,268,795	5,583,690	7,436,919
Apr.	7,279,321	5,287,972	7,162,460
May	7,540,889	5,423,168	7,209,396
June	7,770,213	5,887,488	6,950,059
July	6,250,597	4,490,179	6,582,513
Aug.	7,053,615	4,681,242	6,498,605
Sept.	7,378,247	5,004,222	6,400,757
Oct.	.....	5,035,364	6,726,850
Nov.	.....	5,240,209	5,903,980
Dec.	.....	5,448,649	5,684,920

American Iron & Steel Institute

peer into next year's order book, it becomes evident that high backlogs will continue. Industry is operating close to capacity, and there's no lessening in demand. New production capacity won't really start going until spring; so orders will keep on piling up.

P. A.'s Contradict Backlogs . . .

Some sources, however, apparently contradict this high backlog situation. Chicago purchasing agents say that 27 per cent of their contacts indicate lower order backlogs for November, compared with the 18 per cent reporting lower backlogs the previous month. Only 36 per cent say backlogs are larger in November, compared with 44 per cent taking that view in October.

The reason seems to be that much of the backlog drop comes in seasonal goods which have been cleared out for the holiday trade. Other bookings still remain high.

Buyer's Market Sighted . . .

"Business will be hard put to maintain its peak profit margins in 1956," asserts Henry H. Heimann, executive vice president of the National Association of Credit Men.

"A real buyer's market is nearer at hand," he adds. Increased competition is the reason. Mr. Heimann suggests: "Large business must give serious consideration to selling efforts, sound credit programs, good merchandise and values."

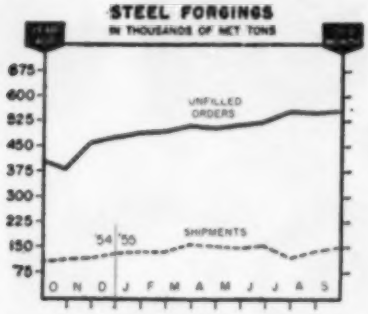
Despite these warnings, the Credit Men's survey reveals that most industrialists believe profits will increase in 1956. Three-fourths of the companies interviewed said they expected to pay about the same dividends. One-fifth estimated dividends will be higher.

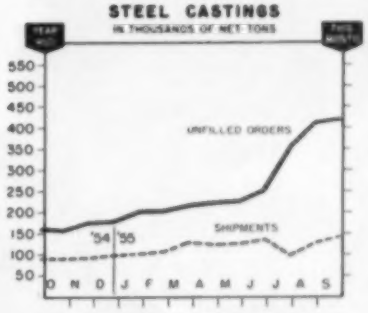
Carloadings to Rise . . .

Freight carloadings in the Midwest are expected to rise 2.5 per cent in the first quarter of 1956, compared with this year's first quarter.

Paul M. Ashe, general secretary of Trans-Missouri-Kansas Shippers Board, predicts that total loadings in that area will amount to 324,378 cars in the first three months of next year, up 8004 over a year ago.

One boost will be a 15.6-per-cent increase in iron and steel shipments and a 13.8-per-cent rise in automobiles and trucks. The biggest rail-shipped commodities, coal





	Shipments		Unfilled Orders	
	1955	1954	1955	1954
Jan.	136	139	488	638
Feb.	135	127	492	539
Mar. ...	154	130	507	487
Apr. ...	150	116	499	460
May ...	147	107	509	431
June ...	155	113	520	409
July	115	97	552	395
Aug. ...	135	102	547	410
Sept. ...	149	109	552	409
Oct.	...	113	...	382
Nov.	...	120	...	461
Dec.	...	129	...	473

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more

	Shipments		Unfilled Orders*	
	1955	1954	1955	1954
Jan ...	98.2	122.8	201.5	251.8
Feb. ...	106.4	116.5	202.3	234.6
Mar. ...	127.5	122.3	215.1	214.3
Apr. ...	120.1	105.8	221.3	197.9
May ...	122.5	94.6	225.3	182.5
June ...	133.9	100.0	251.4	169.6
July	97.8	75.8	354.6	170.6
Aug. ..	126.4	89.6	413.5	168.3
Sept. ..	140.8	88.4	420.6	158.8
Oct. ...	....	87.1	....	184.1
Nov. ...	....	87.7	....	175.7
Dec. ...	....	93.5	....	179.1
Total ..	....	1,184.1		

*For sale. U. S. Bureau of the Census

and coke, will increase 7.7 per cent.

Coal production should top 450 million tons, estimates A. C. Campbell, president of the National Coal Association. He's worried about getting enough rail cars for shipments. That seems to be the bottleneck to even higher production rates.

No wonder backlogs are booming. Next year's freight car production is expected to hit 70,000, 80 per cent more than in 1955.

No Lag in Farm Equipment . . .

"Retail farm equipment sales next year should be about the same as in 1955," predicts Paul M. Mulliken, executive director, National Retail Farm Equipment Association.

It's estimated that the average dealer (among 15,000) will have sold $275,000 worth of farm equipment, parts and service this year. About 45 per cent of that volume has been in new farm equipment and close to 16 per cent in used stocks.

Next year, NRFEA expects that new equipment sales will drop to about 40 per cent of total volume. Used equipment sales will rise to a bit more than 20 per cent.

Spark in Electrical Supplies . . .

Electrical manufacturers, too, are predicting a good year. Joseph F. Miller, managing director, National Electrical Manufacturers Association, says: "Shipments will top 1955 output by 7.5 per cent."

Electrical building equipment, insulating materials, wire and cable, illuminating equipment, industrial apparatus and transmission equipment are expected to show a 5-per-cent increase.

Signaling and communication equipment, plus electric appliances, are expected to boost shipments 10 per cent.

Trends Fore and Aft . . .

No early slackening from present high levels is in sight for business and industrial activity, forecasts the First National City Bank, New York, although it includes automobile production and sales among the "uncertainties" in the outlook . . . There's a strong possibility that consumer credit buying will decline in the coming year, suggests T. V. Houser, Sears Roebuck & Co., chairman . . . Boeing Airplane Co., Seattle, reports a backlog totaling about $1.9 billion in unfilled orders.

precision demands the best material

From years of experience, top die sinkers throughout the industry have come to rely on the quality and dependability built into each Heppenstall Hardtem Die Block. J. W. (Walter) Harwood, prominent Cleveland die sinker for over half a century, watches his oldest associate, Henry Weed, sinking a large Hardtem die block. In his new, modern shop, he easily handles blocks weighing as much as 6 tons—up to 36 inches wide by 144 inches long.

That's why users everywhere are today buying and relying upon Heppenstall Hardtem Die Blocks — for the consistent performance they have found over the years they can trust.

Hardtem Die Blocks are upset-forged of a special patented Heppenstall alloy steel — preheated and tempered until just the right physical properties are attained. They must be uniform in hardness . . . able to hold closer tolerances and provide longer-lasting impressions.

Then they're shipped to you to afford the maximum wear, heat, and shock resistance demanded for your finest workmanship.

You can trust Hardtem's top performance — for its quality is under constant study and development by both Heppenstall's engineering and research staffs.

Make Heppenstall your standard die block specification.

HEPPENSTALL

. . . the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

ROBERT H. ETNYRE
. . . National Supply plant manager

Robert H. Etnyre was appointed plant manager of **National Supply Co.** at Toledo, O. He succeeds **Robert E. Valk,** who resigned as works manager.

Wayne H. Hunter, executive vice president, was elected president and treasurer of **Youngstown Steel Tank Co.,** Youngstown. **William K. Hunter,** former president, is now chairman of the board. He also serves as president of Hunter Construction Co. Other elections: **Robert L. Hunter,** vice president; **Sidney J. Collins,** secretary.

International Resistance Co., Philadelphia, elected **Harry A. Ehle** to executive vice president and **Jesse Marsten** to senior vice president.

Pfaudler Co., Rochester, N. Y., elected **Ranlet Miner** chairman of the board and **Donald A. Gaudion** executive vice president.

Karl Eschelbach was made sales manager of **Efficient Tool & Die Co.,** Cleveland. **Clarence A. Nadsady** was made general manager of Plant 1 at 9314 Elizabeth Ave.

Joseph Solari was elected executive vice president of **Great Lakes Carbon Corp.,** New York.

A. I. Savin was elected vice president of **Merritt-Chapman & Scott Corp.,** New York.

JAMES D. WHITE JR.
. . . president of Darwin & Milner

James D. White Jr. was elected president of **Darwin & Milner Inc.,** Cleveland. He has been vice president and general manager for the last five years.

B. H. Sullivan Jr. was made assistant vice president of **Magnus Metal Corp.,** New York, subsidiary of National Lead Co. He will assist in handling western sales. **J. J. Croft** was made St. Louis district sales manager. **L. J. Gruber** transfers from Cincinnati to Chicago in the sales department.

Donald J. Whiteman was made plant superintendent of **Anti-Corrosive Metals Products Co.,** Castleton, N. Y., to succeed the late **David Armstrong.**

Harry E. Connors was made general manager of railroad sales for **National Bearing Division,** American Brake Shoe Co. He is at Chicago.

R. R. Klinge was appointed chief chemist at the Massillon, O., steel plant of **Republic Steel Corp.** He succeeds the late **E. F. Camp.** Replacing Mr. Klinge as chemist of the Massillon coke ovens and blast furnace laboratory is **Dwight A. Gerstenmaier.**

Ray A. Hulce was made general purchasing agent of **Lincoln Division,** Ford Motor Co., Dearborn, Mich.

MERRILL A. HAYDEN
. . . general manager of Waterbury Tool

Merrill A. Hayden was appointed general manager of **Waterbury Tool Division,** Vickers Inc., Waterbury, Conn. He replaces **Warren E. Rouse,** retired. Mr. Hayden became assistant general manager in 1953. Mr. Rouse continues in a consulting capacity.

J. A. Varney and **T. A. Feeney** were elected vice presidents of **Coleman Engineering Co.,** Los Angeles.

Robert O. Vaughan was elected vice president of **National Aircraft Co.,** Los Angeles.

Norman H. Schwarz was made machine shop manager, **Greer Hydraulics Inc.,** Jamaica, N. Y.

Philip S. McNellis was named general purchasing agent and **John L. Carmichael** traffic manager of **Delco Appliance Division,** General Motors Corp., at Rochester, N. Y.

Larry A. Pulley was made general sales manager of **Accurate Threaded Fasteners Inc.,** Chicago.

Henry A. Roemer Jr., president and director of **Sharon Steel Corp.,** Sharon, Pa., has retired from the company. **Henry Roemer** was appointed president and continues to serve as chairman of the board, chairman of the executive committee and chief executive officer. Mr. Roemer Jr. will devote his time to

DR. S. J. BEGUN
. . . Clevite marketing director

ROBERT T. ROLLIS
. . . Oldsmobile manufacturing director

CLARENCE WANTZ
. . . Robertshaw Thermostat chief engineer

other companies in which he has interests.

Dr. S. J. Begun was made director of marketing for **Clevite Corp.**, Cleveland. Formerly a vice president and director of Clevite's Research Center, he now supervises the company's patent and market research departments, and co-ordinates development of new products and new markets in this country and abroad.

Bob Decius succeeds **Parker Jameson** as sales engineer in the East Bay section of San Francisco for **Connor Spring Mfg. Co.** Mr. Jameson is now manager, Dallas division.

H. M. Harper Co., Morton Grove, Ill., appointed **R. N. Hillner** manager of standard product sales. **John A. Stevenson** was made manager of technical sales.

Raymond Meyer was named supervisor of manufacturing for **ElectroData Corp.**, Pasadena, Calif.

General Controls Co. named **Jack Croushore** manager, Chicago regional office, and **Ray Wheeler** manager of the Columbus, O., office.

Robert T. Rollis was promoted to general manufacturing manager, **Oldsmobile Division**, Lansing, Mich., General Motors Corp. He was manufacturing manager. He now directs operations in Oldsmobile's three Lansing plants. **Russell E. Hansen**, former director of production engineering, was named assistant general manufacturing manager to Mr. Rollis. **Robert P. Russell** succeeds Mr. Hansen as director of production engineering.

Chain Belt Co., Milwaukee, promoted **W. B. Marshall** from sales promotion manager to fill the new post of manager for market development and sales training.

Myron A. McAlpine was promoted to superintendent of merchant mills at **Youngstown Sheet & Tube Co.'s** Indiana Harbor, Ind., Works.

Clarence Wantz was made chief engineer in charge of the engineering department of **Robertshaw Thermostat Division**, Robertshaw-Fulton Controls Co., Youngwood, Pa. He replaces **M. C. Potter**, resigned.

Morin J. Heric was named manager of the purchasing administrative department of the special products division, **Ford Motor Co.**, Detroit. He held a similar position with the aircraft engine division in Chicago.

Walter A. Stadtler was made director of manufacturing engineering for **International Business Machines Corp.**, New York. He was manager, IBM technical services laboratory, Poughkeepsie, N. Y.

Fred S. Gombert was elected divisional vice president, **Ingersoll Conditioned Air Division**, Borg-Warner Corp., at Kalamazoo, Mich.

Dr. Harry L. Bishop Jr. was made development engineer-process metallurgy in the technical services division of **Jones & Laughlin Steel Corp.**, Pittsburgh.

Superior Tube Co., Norristown, Pa., appointed **George Krauss Jr.** to its technical division and **Rodney G. Utter** to its mechanical development division.

Edward H. Cherniss was made manager of foreign operations at **Beckman Instruments Inc.**, Pasadena, Calif.

Jesse F. Core was made general superintendent of the Frick district mines of **United States Steel Corp.'s** coal division. He has headquarters in Uniontown, Pa. He succeeds **William R. Stedman**, now staff assistant to the vice president. **August R. Werft** succeeds Mr. Core as chief engineer, Frick district mines.

A. E. Swendenborg was appointed general sales manager of **Benjamin Electric Mfg. Co.**, Des Plaines, Ill. **Robert J. Mors** was made assistant sales manager.

Dr. Hans Beller was made manager of the new acetylene products plant of **General Aniline & Film Corp.** at Calvert City, Ky., soon to be constructed.

Louis F. Leonhart was made factory manager of the Jamestown

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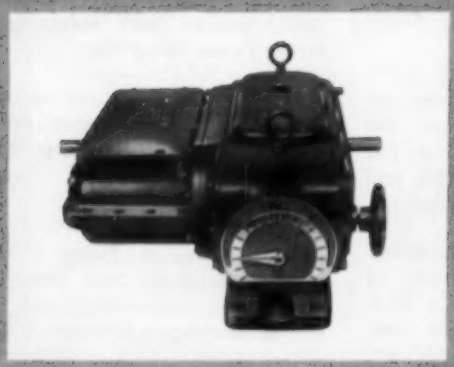

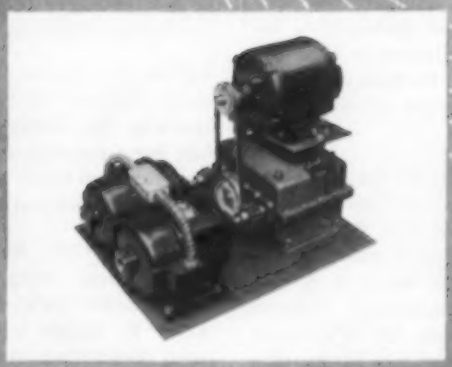

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RUSSELL M. FOWLER
. . . Harris-Seybold engineering post

E. C. TINSLEY
. . . Mexico Refractories post

HUBERT C. SMITH
. . . CF&I v. p.-eastern division

and Falconer, N. Y., plants of **Marlin-Rockwell Corp.**

Russell M. Fowler was made chief industrial engineer for the Harris Division at Cleveland, **Harris-Seybold Co.** He was manager of incentives and continues in that position. **John D. Perhacs** was promoted to supervisor of industrial engineering.

In **General Electric Co.'s** instrument department in Lynn, Mass., **Isaac F. Kinnard** was made manager-special projects and studies. He is replaced by **Mark A. Princi** as manager-engineering. **Thomas O. Paine** succeeds Mr. Princi as manager-measurements laboratory.

Tube Reducing Corp., Wallington, N. J., organized its sales department into three divisions: **C. L. Megargle**, assistant sales manager, will also be manager of specialty tube sales. **Byron C. Hague** will be manager of bearing tube sales. **T. L. Lee** will be manager of rock-drawn tube sales.

Anthony A. Toggweiler was made assistant sales manager, Chicago district, **Republic Steel Corp.** He succeeds **W. J. Jack**, retired.

E. C. Tinsley was elected vice president in charge of refractory specialties for **Mexico Refractories Co.**, Mexico, Mo. **Halfred F. Randolph**, former assistant manager, is now manager of the refractory specialties division.

Harold E. Kingsbury was made chief engineer of West Coast operations for **Chrysler Corp.** He has been resident engineer at the Los Angeles plant since 1951 and continues headquarters there.

John B. Laramy was made assistant general sales manager of **Worthington Corp.**, Harrison, N. J. **Alvin F. Welsh** was made manager, marketing research department.

William O. Bishop was made superintendent of blast furnaces and **Richard J. Wilson** assistant superintendent for plant two at the Indiana Harbor Works of **Inland Steel Co.**, Indiana Harbor, Ind.

Dr. Thomas A. Henrie joined **Electro Metallurgical Co.'s** metals research laboratories in Niagara Falls, N. Y. He was appointed a research chemist in the chemicals research group.

Hubert C. Smith was elected vice president in charge of operations of the eastern division of **Colorado Fuel & Iron Corp.** He will have headquarters at Claymont, Del. Mr. Smith was formerly vice president, quality and research, at Great Lakes Steel Corp.

John D. Horth was made assistant manager, compressor sales department, **De Laval Steam Turbine Co.**, Trenton, N. J.

Leslie Co., Lyndhurst, N. J., appointed **Alfred A. Fuhro** director of manufacturing; **Sten Soderberg**, director of engineering; and **Russell W. Boettiger**, director of sales.

Harlan L. Meredith accepted a position as staff assistant at **Airline Welding & Engineering**, Hawthorne, Calif. He will work on research welding and process tooling development projects.

Superior Steel Corp., Carnegie, Pa., elected **John C. Ferguson** secretary, replacing **Ellen A. Carlson**, resigned. Miss Carlson was made assistant secretary and continues as assistant treasurer. Mr. Ferguson, who joined the firm in July, was assistant to the president.

OBITUARIES . . .

Charles W. Flaisig, 51, since 1941 purchasing agent for **Steel Improvement & Forge Co.**, Cleveland, died Nov. 30.

Alonzo J. Rose, 66, vice president-sales, **Greenville Steel Car Co.**, Greenville, Pa., died Nov. 30.

Edward J. Harley, 67, chief engineer for **Baldwin-Lima-Hamilton Corp.**, Eddystone, Pa., died Nov. 26.

Frank J. Miller, 81, board chairman of **Elkhart Bridge & Iron Corp.**, Indianapolis, died Dec. 6.

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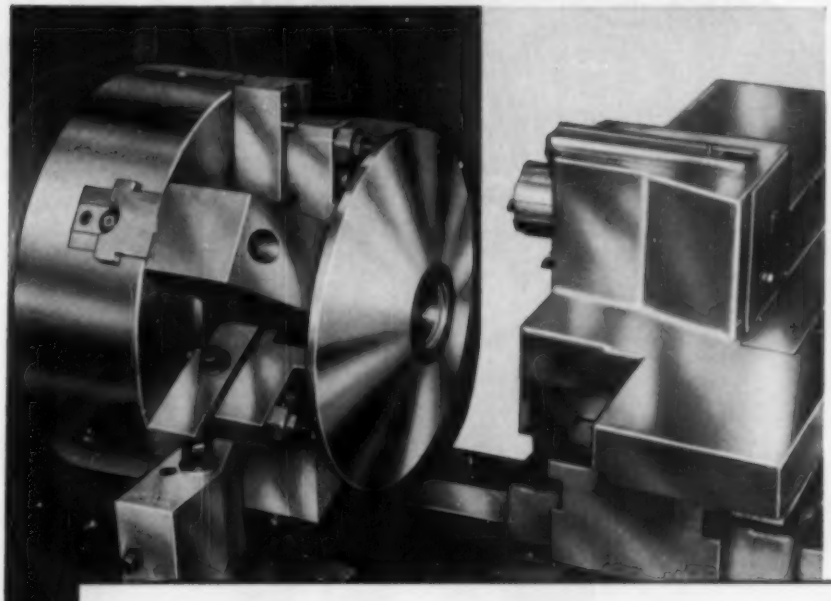
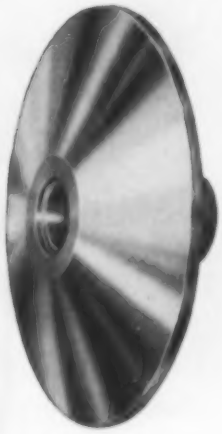


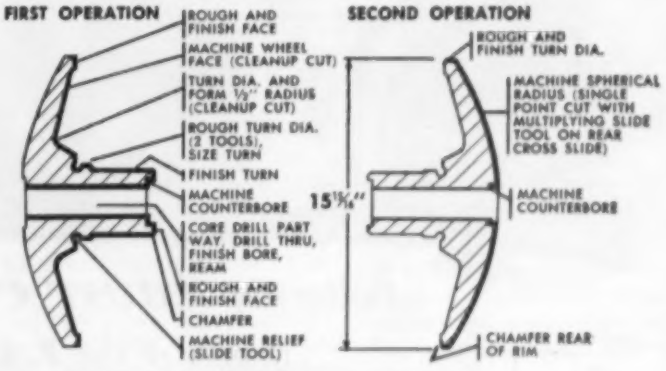


A POTTER & JOHNSTON 4-U Automatic Chucking Turret Lathe can produce a part like this every 19.1 minutes!

PART: Transmission Wheel

MATERIAL: Nitralloy Steel Forging

REQUIRED: 2 Operations, a Total of 23 Separate Cuts including 2 Radii and a Relief Cut



HEAVY LINES INDICATE MACHINED SURFACES

CAN YOUR PRESENT EQUIPMENT MATCH THIS PERFORMANCE?

Check your production records. If they don't measure up to the example shown above, you're missing important opportunities for faster output and bigger profits. It takes a truly modern machine like the P&J 4-U – with the extra power, speed, rigidity and versatility needed to handle tough alloys and complex cuts – to compete profitably in today's markets. You can't *afford* second-best equipment . . . so write now for full information on the finest. Ask for P&J Bulletin No. 158 describing the Potter & Johnston 4-U Automatic and including complete engineering data.

Precision Production Tooling for more than Fifty Years

POTTER & JOHNSTON COMPANY

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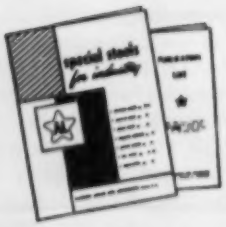
SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

Dollars of ***FIRST COST*** *aren't so big...*
if they're the ***LAST COST***



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AL Stainless Steel

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Warehouse stocks carried by all Ryerson Steel plants

Alcoa Expanding

$4-million mill for rolling narrow, light-gage sheets will be installed in Tennessee plant

BOOMING demand for aluminum alloy sheet in light gages and narrow widths has prompted Aluminum Co. of America, Pittsburgh, to plan an expansion of its facilities to fabricate this product.

A 44-in. rolling mill, capable of producing close tolerance coiled or flat sheet in finished widths up to 36 in., will be added to existing rolling equipment at the company's Alcoa, Tenn., Works.

18-Month Project—Construction of an extension to the Alcoa North plant to house the new mill will be started early next spring, says W. W. Wright, manager of the plant's Fabricating Division. The project will cost more than $4 million and will take 18 months to complete.

The 44-in. mill will cold roll coils of heavy-gage aluminum alloy sheet into gages as light as 0.006-in., while maintaining precision tolerances and a highly uniform finish.

Demand for sheet of this type and quality has been growing with its application in such items as aluminum venetian blinds, sheathing for electrical conductors, containers, lamp bulb bases and kindred volume uses.

New Aluminum Extrusion Plant

Reynolds Metals Co., Louisville, has broken ground for a $5.5-million aluminum extrusion plant near Richmond in Chesterland county, Virginia. The plant is expected to be in operation by the third quarter of 1956 and will supplement the company's other extrusion plants in Louisville, Grand Rapids, Mich., and Phoenix, Ariz. A. M. Murphy has been appointed manager of the new plant.

American Welding Buys Firm

American Welding & Mfg. Co., Warren, O., purchased the plant and property of Standard Boiler & Plate Iron Co., Niles, O. The company will move its Amweld Building Products Division (folding steel doors and frames) into the Niles plant and will have more room for expansion of its Warren plant facilities for production of jet engine components, rings and other parts.

Enters Rare Earths Field

Michigan Chemical Corp., St. Louis, Mich., has entered the rare earths field through the acquisition of Saturnium Corp. Dr. H. J. Fleischmann, who headed Saturnium, becomes technical director of Michigan Chemical's new Rare Earths Division. Saturnium will move its research laboratory from California, Ky., to St. Louis. It will continue rare earths research and place in operation pilot-plant procedures now ready for commercial applications.

Crucible Builds in Texas

Crucible Steel Co. of America, Pittsburgh, is constructing a warehouse in the Brook Hollow industrial district of Dallas. Completion is expected by next January. Ross Cummings and Lowrey Pearson are Crucible's representatives in that city.

Titanium Sponge Plant

Construction of the first titanium sponge plant in the U. S. which uses the sodium reduction process is proceeding rapidly at Ashtabula, O. The plant will mark the entry of Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York, into titanium sponge production. Operations are expected to start in the third quarter of 1956. Rated capacity will be 7500 tons of titanium sponge per year.

Timken Expanding Plant

L. D. Gable, general manager of Timken Roller Bearing Co.'s Columbus, O., plant says the $5 million appropriation announced earlier this year (STEEL, Oct. 17, p. 101) for the manufacture of railway bearings will be spent at the Columbus plant. Included in the new producing unit will be screw machines, heat-treating equipment, roller headers, inspection and shipping departments. Orders for the new equipment are being placed. Completion of the railroad bearing production unit is set for Jan. 1, 1957. It will have an annual capacity of 160,000 bearings.

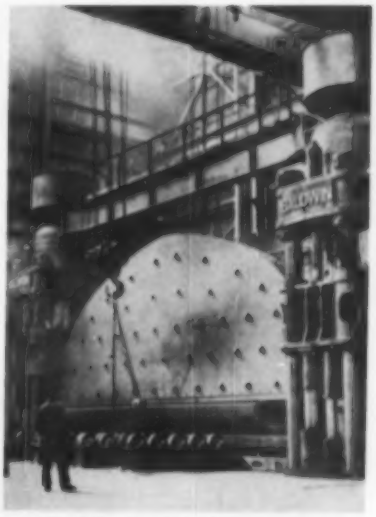


Plate Gets the Bends

Operator of this beam bending press at Foster Wheeler Corp.'s Mountaintop, Pa., plant can control beam travel to within 0.03-in. Built by Baldwin-Lima-Hamilton Corp., this press is rated at 8000 tons and will bend hot steel plate 7 in. thick

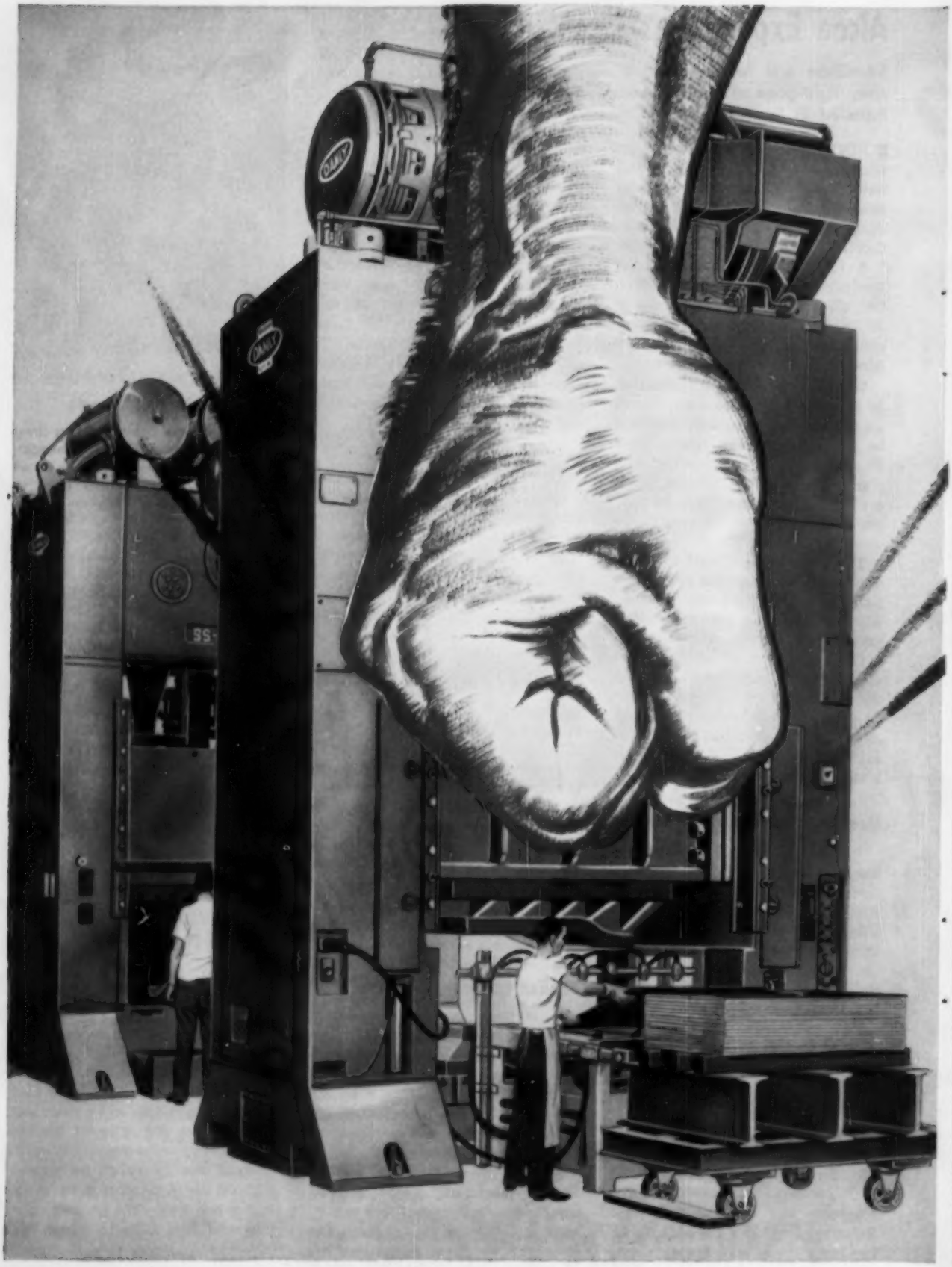
Forms New Division

R. Hoe & Co. Inc., New York, maker of printing presses and saw equipment, established a Contract Manufacturing Division to accelerate and expand its activities in special machine design, engineering and other precision production.

Castings Firms Merge

General Steel Castings Corp., Granite City, Ill., has acquired National Roll & Foundry Co., Avonmore, Pa., and will operate the property as a subsidiary. General Steel's principal business has been production of large intricate steel castings, including engineered cast steel devices for railroad use and other heavy steel castings for industrial use. Through its acquisition of the Avonmore firm, it enters a new field—the production of iron and iron-alloy rolls for roll-

(Please turn to page 78)



Here, welds have "guts" to withstand

400 tons of PUNCH

A. O. Smith electrodes are used to weld this 400-ton Danly press... a massive double-action unit that turns sheet steel into functional shapes

DANLY MACHINE SPECIALTIES, INC., know that high-production machinery requires bonus strength and stamina. The company's presses are used to produce everything from small appliance parts to automobile bodies. Output ranges up to 1,000,000 stampings per eight hour day.

Danly chooses A. O. Smith electrodes to make welds that stand up to toughest production needs. Consider, for example, the electrode used by Danly to build the 400-ton press pictured at left:

SW-35 (AWS-E-6020) for deep groove horizontal fillet and downhand mild steel welding. A "hot" mineral type electrode. You get remarkable speed and extreme ductility. Operation is quiet with fine spray and smooth arc. Produce 45° fillets without undercut . . . obtain consistently good x-ray quality. Yield point, as welded, is 56,600 psi . . . stress-relieved 48,900 psi.

Want more facts about A. O. Smith electrodes? See your man from A. O. Smith . . . or write A. O. Smith Corporation, Welding Products Division, Milwaukee 1, Wis., for a complete electrode catalog.

The man from A. O. Smith...

Owen Lundgreen is the representative who helped Danly select the right A. O. Smith electrode for press production. More than just a salesman — a real welding consultant —your man from A. O. Smith is exceptionally qualified to help you with your welding problems.

Through research A.O. Smith *...a better way*

A.O.Smith

CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

International Division: Milwaukee 1, Wisconsin, U. S. A.

(*Concluded from page 75*)

ing mills in the steel and other industries. National also makes castings in iron and steel and their alloys.

Ryerson Expands in South

Joseph T. Ryerson & Son Inc., Chicago, plans to build a large steel service plant in Mecklenburg county, northwest of Charlotte, N. C. It will provide facilities for complete stocks of steel bars, plates, structural shapes, sheets and tubular steel products. Equipment will be installed for sawing, shearing and flame cutting steel to customer requirements.

Armco Drainage To Build Plant

Armco Drainage & Metal Products Inc., a subsidiary of Armco Steel Corp., Middletown, O., will build a $1.5-million plant in that city for the production of a new product—a new line of prefabricated, truss-type, steel buildings of unique design. Truss members of cold-formed steel will be used in place of heavy, hot-rolled structural shapes.

Atwood Buys A.B.T. Mfg. Corp.

Atwood Vacuum Machine Co., Rockford, Ill., purchased A. B. T. Mfg. Corp., Chicago, and will operate it as a wholly owned subsidiary. W. A. Patzer continues as president of the Chicago firm, manufacturer of automatic merchandising mechanisms. Atwood makes automotive hardware, trailer parts, bicycle accessories and stampings.

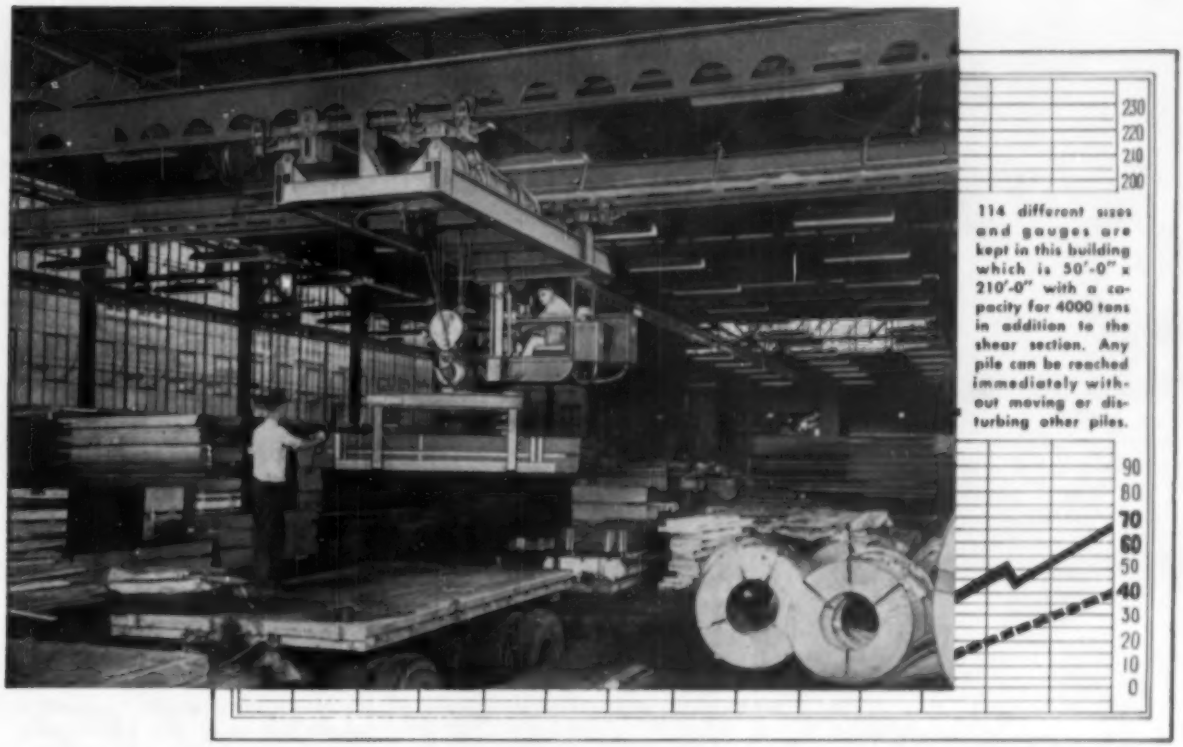
Major Appliance Firms Merge

Cory Corp. purchased Mitchell Mfg. Co. and will operate the property as a wholly owned subsidiary. Cory makes all types of air treatment appliances, coffee makers and other appliances. Mitchell is one of the pioneers in the air conditioning field. Both are Chicago firms.

Cory has broken ground for a new executive office building at 3200 W. Peterson Ave. on Chicago's near north side. If the executive and office staff of the Mitchell organization is consolidated in the new location, the new

Crane Cuts Steel Handling Costs 66⅔%

Boosts Shear Production 40%



Up to 15 truck loads, or 150 tons of incoming steel are handled in a day by a 5 ton, 48'-0" span, 3-runway Cleveland Tramrail crane in the warehouse of the Art Metal Construction Co., Jamestown, N. Y., well-known manufacturers of office furniture. This formerly was lifted off the trucks with a chain hoist onto floor trucks which handled it thereon.

The new Tramrail Crane takes the steel directly from trucks to storage without re-handling, and, also, from storage to shears. One man in the crane cab and another on the floor take care of the entire steel handling job. The man-hours required for this have been cut to one-third.

An extra advantage, not originally anticipated, has been the increased output of the six shears. Formerly, it was necessary for the shear operators to haul the steel they cut, from storage to their machines. Now this is done by the crane. As a result, the shears are in operation more of the time and shear production has been increased 40%.

Properly engineered overhead Tramrail equipment can be such an important factor in lowering costs and securing other advantages that we urge you to have a nearby Cleveland Tramrail representative check your handling methods.

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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

building probably will have to be enlarged.

Abrasive Products Firm Expands

Bay State Abrasive Products Co., Westboro, Mass., is planning a $2-million building program, supplementing additional manufacturing space completed two years ago. The new program includes a plant for production of rubber-bonded grinding wheels and increased warehouse space.

Polis Buys Blair Pin Bolt Co.

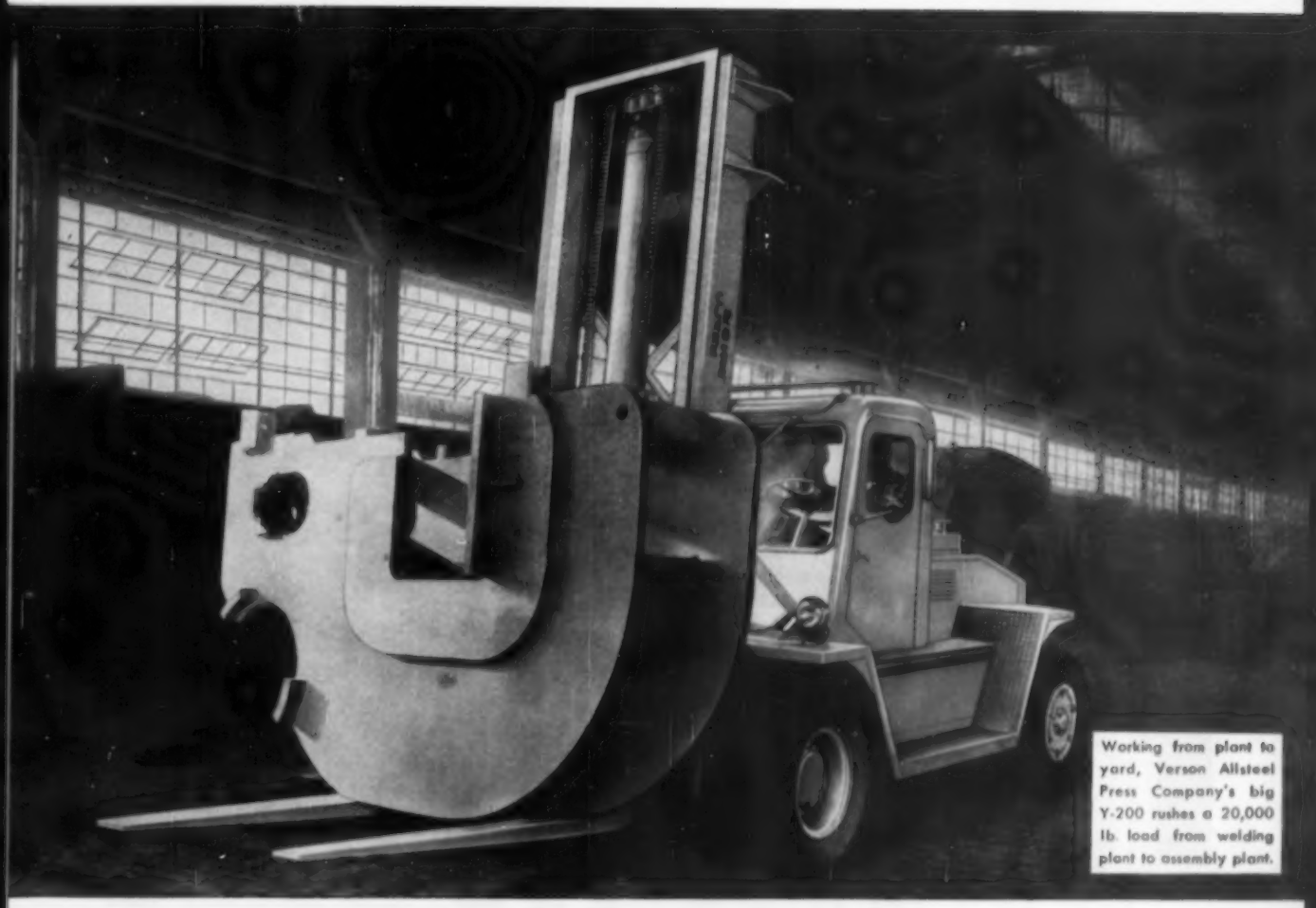
J. D. Polis Mfg. Co., Chicago, purchased Blair Pin Bolt Co., Chicago and Los Angeles, manufacturer of expansion anchors and bolts. Manufacturing and sales will be integrated and consolidated with the present J. D. Polis manufacturing facilities in Chicago.

Unites Governor Manufacturers

Massey Machine Co. Inc., Watertown, N. Y., has become a wholly owned subsidiary of Curtiss-Wright Corp. and will be operated as a division of Marquette Metal Products Co., Cleveland, another wholly owned subsidiary of Curtiss-Wright. Principal products of the Massey firm are hydraulic governors for diesel and gas engines, which will supplement the line of hydraulic governors made by Marquette. The two subsidiaries are consolidating and expanding their research and engineering facilities.

Rockwell To Make More Valves

A modernization and expansion program designed to increase valve production by 50 per cent, cut costs and improve working conditions has been launched at Rockwell Mfg. Co.'s Barberton, O., Division. Additional enclosed manufacturing and shipping space is being added to the 400,000-sq-ft plant. New larger-capacity foundry molding and pouring equipment and improved utility lines will be added. New cupola-charging equipment will result in about a 60 per cent reduction in materials handling costs. Similar savings in other operations will be obtained through conveyorization and improved pro-



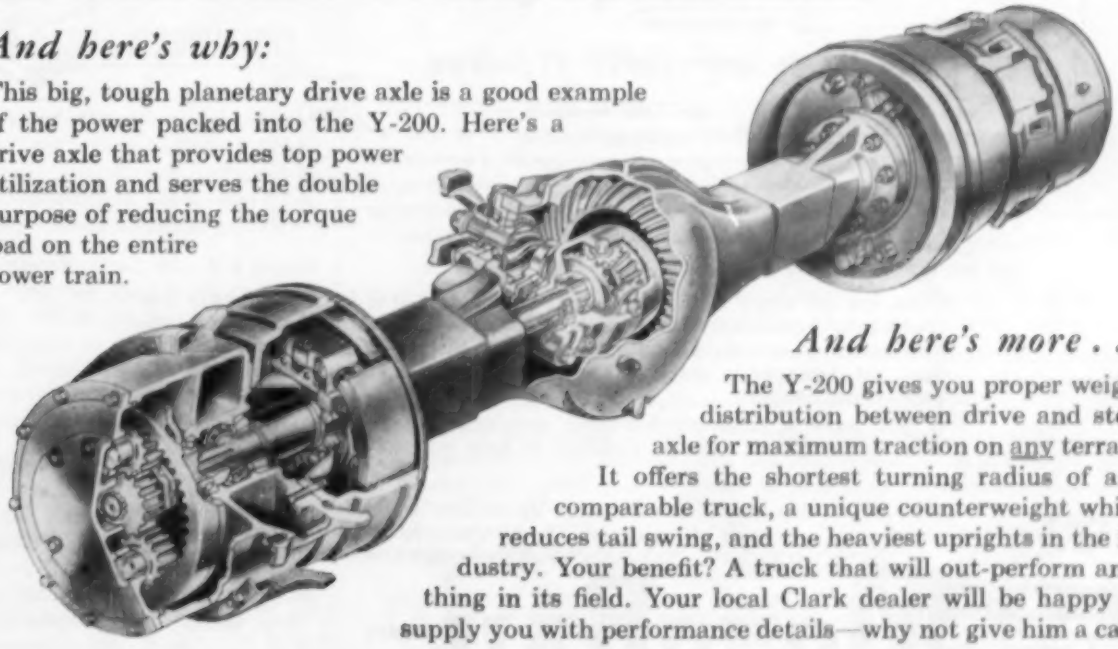
Working from plant to yard, Verson Allsteel Press Company's big Y-200 rushes a 20,000 lb. load from welding plant to assembly plant.

In a plant or in a yard . . .

Clark's Y-200 just doesn't stop!

And here's why:

This big, tough planetary drive axle is a good example of the power packed into the Y-200. Here's a drive axle that provides top power utilization and serves the double purpose of reducing the torque load on the entire power train.



And here's more . . .

The Y-200 gives you proper weight distribution between drive and steer axle for maximum traction on any terrain. It offers the shortest turning radius of any comparable truck, a unique counterweight which reduces tail swing, and the heaviest uprights in the industry. Your benefit? A truck that will out-perform anything in its field. Your local Clark dealer will be happy to supply you with performance details—why not give him a call?

Industrial Truck Division **CLARK EQUIPMENT COMPANY** Battle Creek 26, Mich.

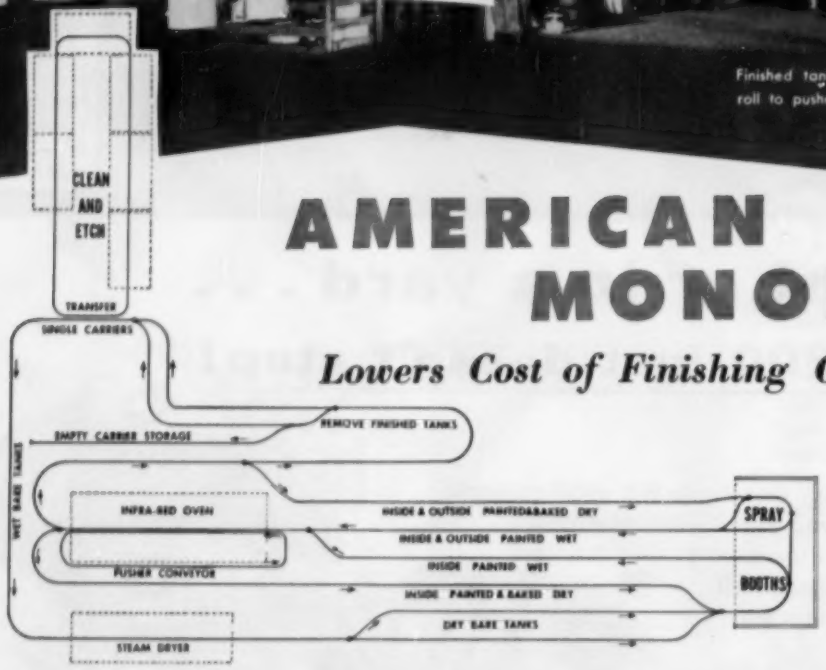
CLARK EQUIPMENT

American MonoRail System for finishing water conditioner tanks.

Finished tanks from spray booth (rear) roll to pusher conveyor in foreground.

AMERICAN MONORAIL

Lowers Cost of Finishing Operation



Costs are cut every step from cleaning and etching to finished tanks in this continuous operation by American MonoRail. For this manufacturer the up-and-over system of materials handling boosted production, improved space utilization, cut damages to material and improved both working conditions and production control.

If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you solve it.

up and over

"Up-and-Over" is the title of our 16-mm. sound film to solve many tough handling problems at low cost. Please allow three weeks to schedule showing.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

Member of Materials Handling Institute - MonoRail Association

duction line layout. A 10-to-15-per-cent reduction of such costs as machining on production jobs is anticipated. Layout of the machine shop addition provides for inline production of volume items with operations linked by conveyor equipment.

Borg-Warner Diversifies

Continuing a policy of diversification, Borg-Warner Corp., Chicago, is purchasing Primor Products Inc., Adrian, Mich., primarily a contract manufacturer of refrigeration units for central air conditioning systems. Primor will be operated as a Borg-Warner division.

NEW ADDRESSES

American Steel Foundries moved its general office to Prudential Plaza, Chicago 1, Ill.

REPRESENTATIVES

Lintern Corp., Painesville, O., appointed Larco Inc. to distribute its railroad, steel mill and factory supplies.

ASSOCIATIONS

Pressed Metal Institute, Cleveland, won the National Safety Council award for outstanding work in reducing the accident frequency rate in stamping plants.

Ernest V. Gent, who has served the **American Zinc Institute**, New York, for 20 years (first as secretary, then as executive vice president) retires on Dec. 31. John L. Kimberley becomes executive vice president on Jan. 1.

American Institute for Imported Steel Inc., New York, elected officers for 1956: President, Nicolas Schilling; first vice president, Herbert Winter; second vice president, Ernst Wimpfheimer; third vice president, Kurt Orban; secretary-treasurer, Joseph L. Wilmotte.

Unique test furnace assures you of better end wall service

with Kaiser Periclase-Chrome Brick

THE refractory test furnace shown at the right was designed by Kaiser Chemicals to aid in the development of superior basic refractories for the steel industry.

One of the most important of its functions is to regularly test the effect of iron oxide and steel furnace slag on various bricks—including Kaiser Periclase-Chrome Brick.

As a result of such careful quality development and control, Kaiser Periclase-Chrome Brick are superior in your furnace—assuring less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

Leading steel producers have found that Kaiser Periclase-Chrome Brick can greatly increase end wall life or greatly reduce wall thickness, when this is preferred.

Let your Kaiser Chemicals sales engineer show you how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content in end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.

think of Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

Kaiser PERICLASE Brick for the Steel Industry:

- Kaiser Periclase Brick (D-S)
- Kaiser Periclase Chrome Brick
- Kaiser Chrome Periclase Brick

***Now available!* A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request

ALLMETAL'S AWARD COMMITTEE huddle includes (l. to r.) Stanley R. Marsh, Marvin Tabak, Jack Epstein, and Nat Epstein. Stainless steel plaque will be awarded to the editor of the magazine carrying the winning article.

$1,000 ALLMETAL AWARD ANNOUNCED

Allmetal Screw Products initiates award for top article about stainless steel

Attempting to bring more information about stainless steel to industry, Allmetal Screw Products announced its sponsorship of an annual award. First prize: $1,000 to the author of the industrial magazine article of most value and interest to those who specify or buy stainless steel parts or components. Need for the award was realized when Allmetal (leading manufacturer of stainless fasteners) found U. S. annual stainless steel volume to have doubled since 1945—but communication about its applications at pre-war level. Hoped-for results: articles about stainless that are clearer, documented, and more informative. Winner will be announced in February at the Garden City, New York, plant.

PANEL FROM STEEL INDUSTRY TO PICK WINNING ARTICLE

ALLEGHENY LUDLUM'S F. Price Norris, Jr., Director of Stainless Steel Sales.

ARMCO'S R. G. Sloan, Manager, Development Engineering Department.

AISI'S Richard E. Paret, Secretary, Committee of Stainless Steel Producers.

CRUCIBLE'S James D. Glenn, General Manager of Sales.

STEEL
December 19, 1955

Technical Outlook

MACHINE WARMER— Ever struggle to hold machining tolerances while you wait for the machine to warm up? In finish boring cam and crankshaft main bearing holes in the V-8 engine block, engineers at Plymouth found they were losing production during the first hour of the first shift. They had to wait for friction to bring the spindles to temperature. Holes (with a tolerance of 0.0005-in.) gaged small. Solution: Four heat lamps, 3 ft above the boring spindles, were installed. The spindles are held at the same temperature as the engine block.

SAVES GAS— An auto with a fuel injection system developed by Du Pont (similar to that in diesels and some airplanes) uses 14 per cent less fuel at speeds up to 60 mph. In the carburetorless car, a pump moves gasoline from the tank through a filter to a fuel injection pump that sprays identical amounts of gas into each cylinder.

CALCULATED ERROR— Engineers at Curtiss-Wright Corp. have come up with a circular slide rule that helps gage parts. The problem: Errors due to a temperature variation of the part and of the gage. Knowing the temperature of each, the inspector uses the slide rule to calculate a correction factor that brings measurements equal to those at a standard 68° F. It's simpler than putting in air-conditioned areas.

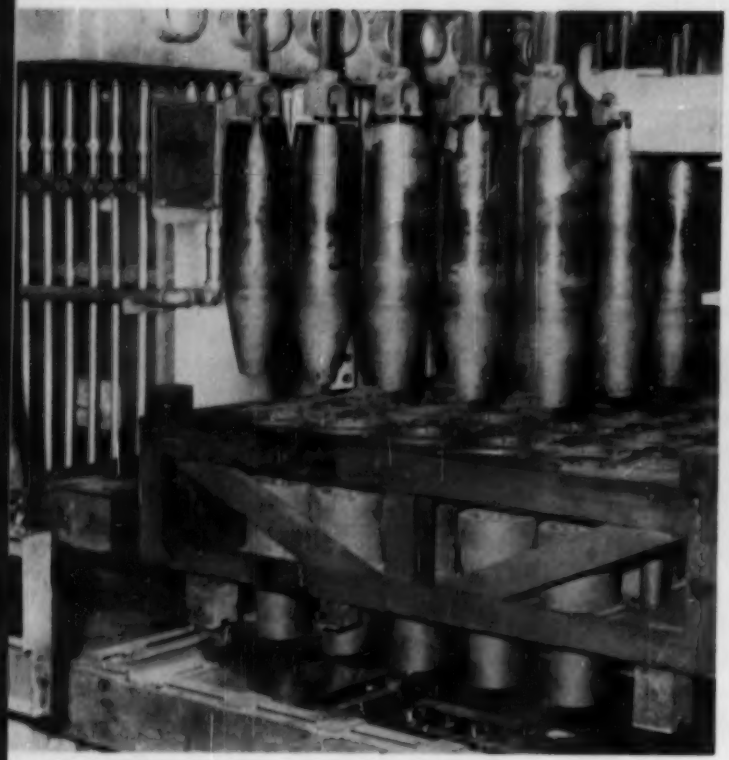
OF COARSE— If you've heard that fine threads are stronger and hold tighter than coarse threads, forget it right now, says Russell, Burdsall & Ward Bolt & Nut Co., which makes both kinds. Choose fine threads for fine adjustment; coarse threads for ability to be twisted tighter with less tendency to strip. Coarse threads tighten in fewer revolutions, are less likely to be damaged in handling and enter nuts and holes with less tendency to cross thread. That means they are more economical, conclude RB&W engineers.

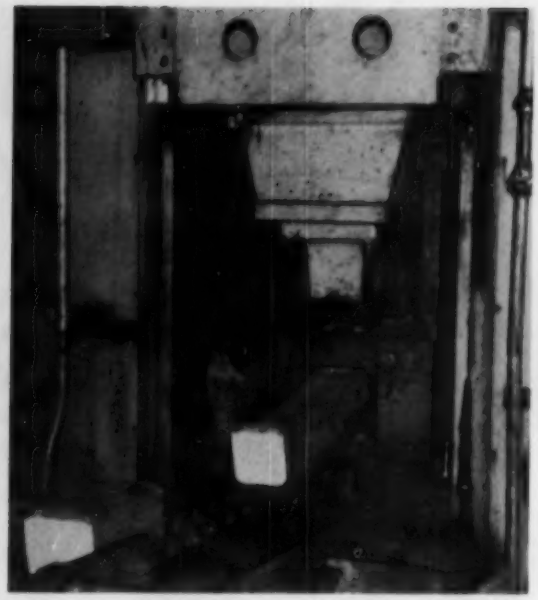
SCOUTING NEW JOBS— The molybdenum industry is looking for new worlds to conquer. Continuing its active program to get the metal going in turbojet engines, the industry is showing high interest in tool holders and boring bars. The metal has a high modulus of elasticity and is easy to fabricate.

CHEAPER ATOM POWER— Atomic power plants using liquid metal as fuel may be the first to generate cheap power. Babcock & Wilcox Co. administered a program in which 14 companies studied the liquid metal fuel reactor system developed at Brookhaven National Laboratory. The fuel — a liquid uranium-bismuth alloy — would circulate within the system. The group estimated that electricity would cost 7.1 mills per kw-hr from a plant of 226,000 kw capacity. Power costs more than that in some parts of the U. S.

TUBE STRIP— A new material with fascinating possibilities is Tube-In-Strip. It's a solid piece of nonferrous strip or sheet containing expandable portions which the user can inflate into continuous running lengths of tube. Revere Copper & Brass Inc. makes it on a rolling mill. It's bound to have applications in heat transfer, refrigeration, air conditioning, automotive, food processing, chemical and aircraft industries. Size and spacing of tubing can be widely varied, and length is virtually unlimited.

Metalworking Outlook—p. 41 Market Outlook—p. 121



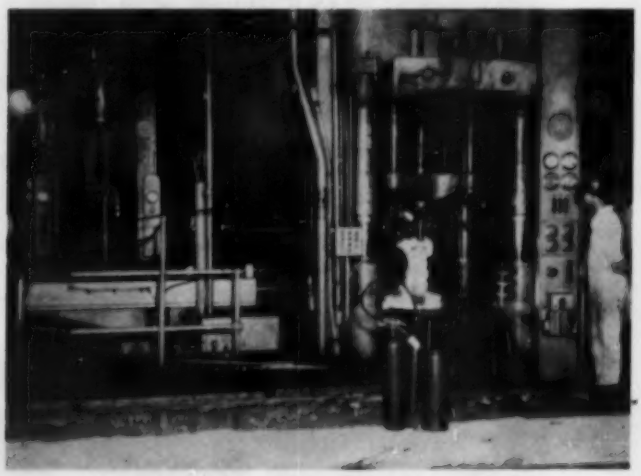


Billets are received in 15-ft lengths. They're nicked by cutting torches into these foot-long slugs. Cross section is 6 x 6 in. After nicking, they're broken (above) in a mechanical press. Ends are hand chipped to eliminate splinters and flakes

Shell Making with the New Look

By ROBERT F. HUBER
Machine Tool Editor

The wraps have just been removed from a shell manufacturing plant in Louisiana. Here is the first public view of what goes on inside



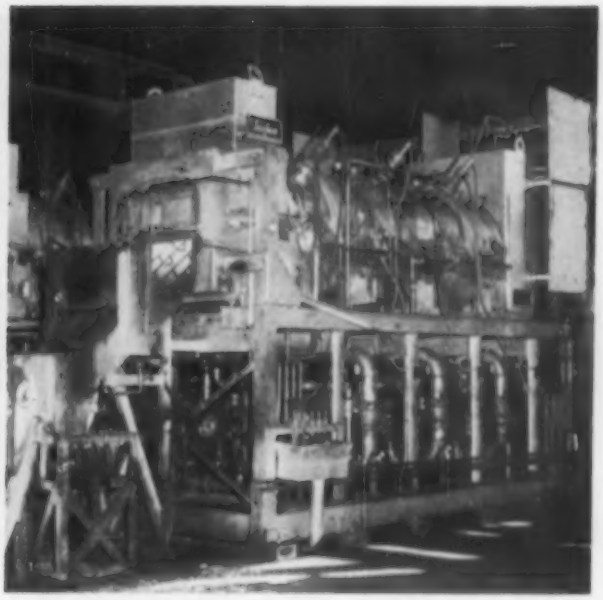
Flaming billet comes out of the piercing press. An automatic manipulator picks it up, indexes it through an air blast that blows out scale, and carries it on to the draw press (left rear). Two piercing presses feed the single draw press. Manipulators are interlocked

IN OCTOBER, 1953, a new plant was in and turning out 155 mm artillery shells at the Louisiana Ordnance plant, near Shreveport. Just six months before, this part of the 16,000-acre reserve had been wasteland. Now one of the most modern shell manufacturing plants in the world, it's operated for the Ordnance Corps by the Remington-Rand division, Sperry-Rand Corp.

With few exceptions, machining adheres to standard shell practice. Conveyors move parts from one operation to the next. Handling, except for loading and unloading machines, is at a minimum.

Preparation—Back of machining, however, is a host of new equipment and new ideas. Heat treating is perhaps most spectacular. Designed and built by May-Fran Engineering Inc., Cleveland, heat-treat

Billets move down the conveyor (upper right) to a transfer that assigns them to one of two forge furnaces. Limit switches at the furnace "tell" the transfer when a billet is needed. Billets roll down incline (center) and are sent to either of two lines through the furnace



Gas-fired forge furnaces bring billets to an even 2250° F. Furnaces have three heat zones, separately controlled. Billets ride through on water-cooled rails, then slide down a chute onto a conveyor that will take them through a coining press and on to pierce and draw

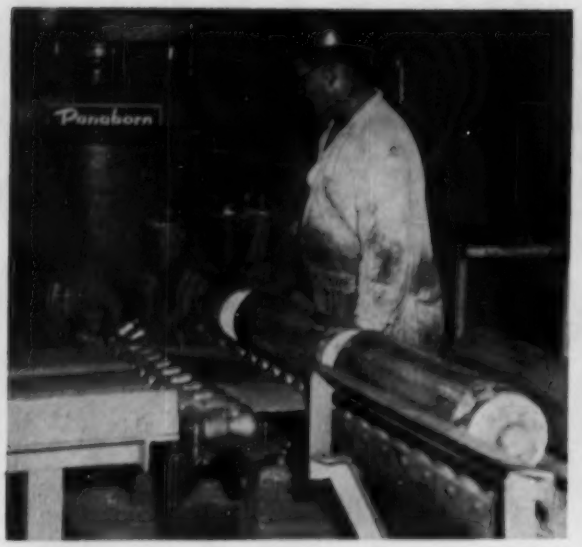
Draw press punch lowers into the shell. After the shell is forced through the draw ring, it drops out onto a conveyor below. It rides the conveyor up to the retarded cooling furnace. Shells are drawn with about 0.1-in. variation in wall thickness; maximum allowed is 0.05-in.

Dogs push shells into a Gas Machinery Co. retarded-cooling furnace. Shells mount on mandrels, are righted and go through vertically. Heating elements along furnace walls prevent excessive cooling of outside shells, cool them at the same rate as those in the center rows

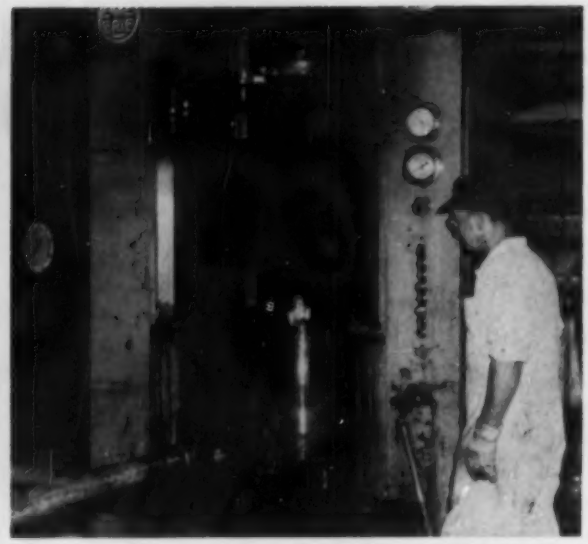
handling equipment utilizes a completely automatic cycle to harden, quench, draw and cool the shells.

Small transfer cars automatically bring a load of 15 shells from the nosing press to the furnace. Here the cars are hoisted, and shells are positioned on hangers which will take them through the cycle.

Hangers become distorted with repeated trips through the furnaces. Some are long, some short. Placing shells on them is tricky business. As the cars rise, long hangers contact first; they push the shells against springs as the car continues to rise. When all shells are in contact with hangers, they're gripped by the car. Next they're lowered ¼-in. and moved into the hangers, so they can be suspended by



Shells are picked off the furnace mandrels and travel on a conveyor to this Pangborn machine which blast cleans the bore. Next comes a rough machining operation where the OD is turned, the open end is cut off to length, the base is faced and the center boss (for handling) is formed

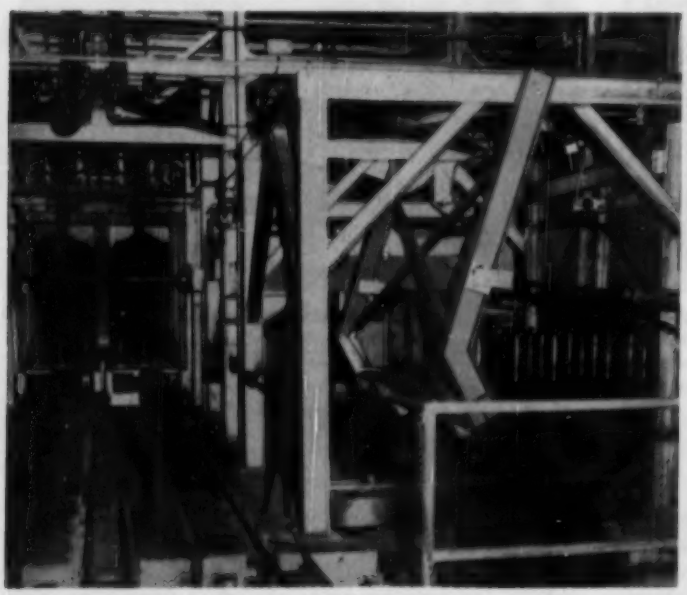


Following rough machining, shells are put in the Surface rotary furnace at rear. Shell noses are brought to 1850° F for nosing (foreground). Mechanical arm picks shells from the nosing press and loads them into cars for the trip to heat treating

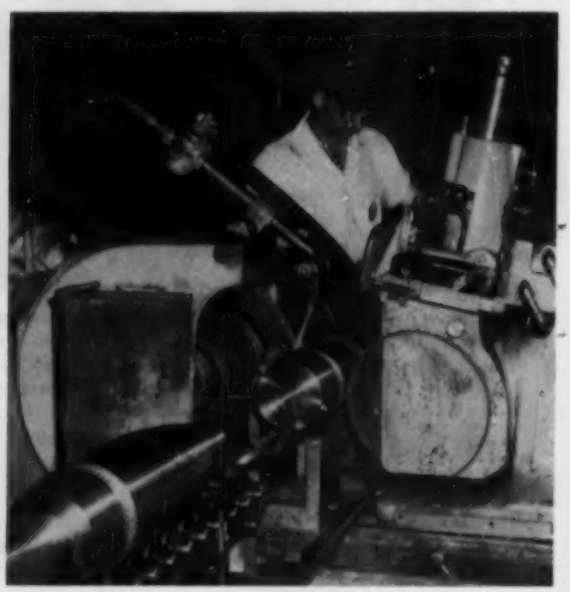
the T-shaped center boss. They're unclamped and the car drops away.

After the shells emerge from the draw furnace, they're again loaded into the cars and ride through cooling and water quench. The miniature railroad that handles the transfer consists of 12 cars, automatic switches and a remote control station that can adjust the cycle.

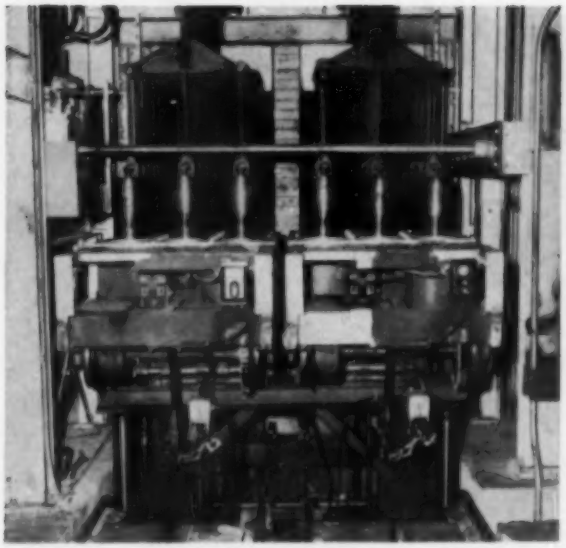
Tight Limits—Unusually close tolerances are held on the forming operations. Part of the credit goes to close control on the tooling. J. M. Lord, manager, shell manufacturing, points out, however, that



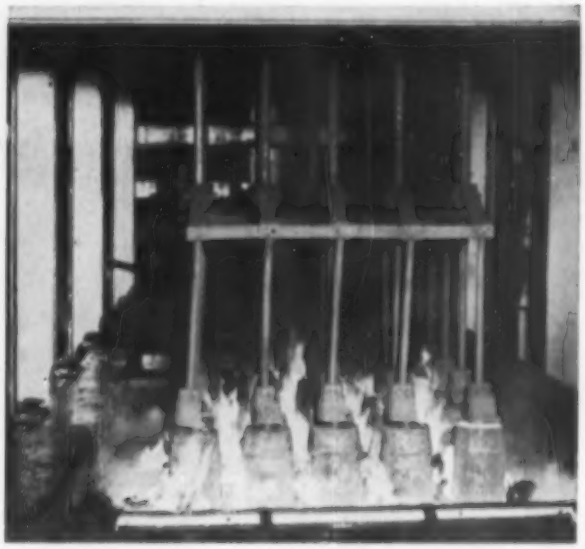
After draw, shells are loaded back into cars and are pushed (at right) into an air-blast accelerated cooling chamber. Next they're water-quenched for 3 minutes. Final hardness is about 285 Brinell. From here the shells go to blast cleaning and finish machining



For simpler handling, the conveyor line in finish machining was run straight through this Cincinnati centerless grinder. Load and unload of the machine are eliminated



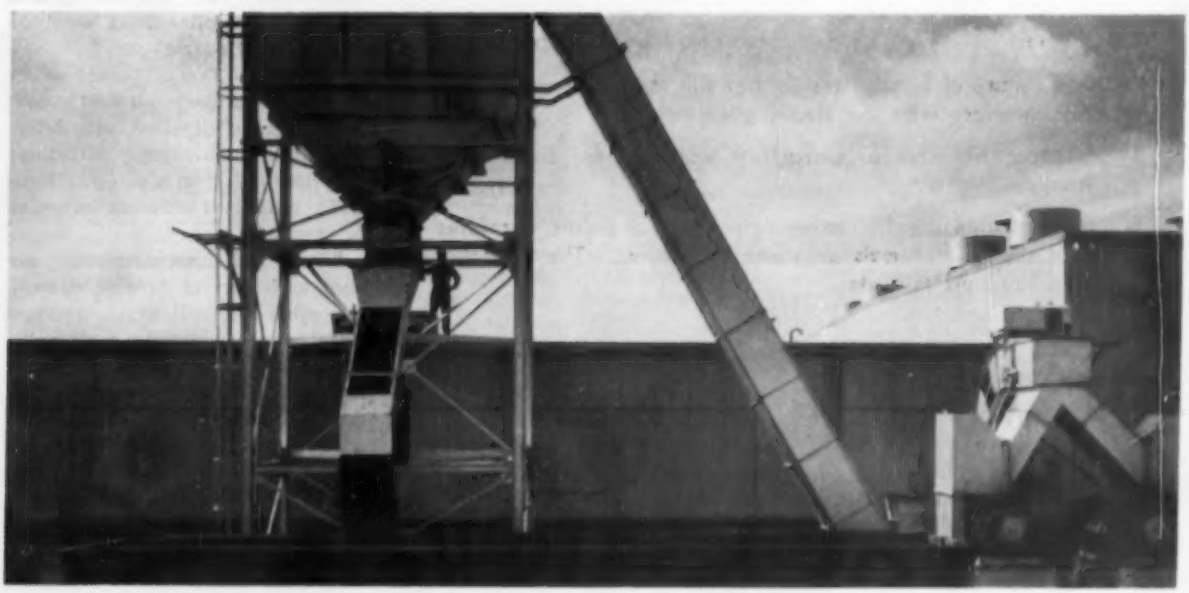
Here two cars, loaded at the nosing press, are hoisted into position at the Surface Combustion hardening furnace. Shells are maneuvered into position for the hangers that will take them through hardening, quench and draw. Since hangers get distorted, delicate positioning is required



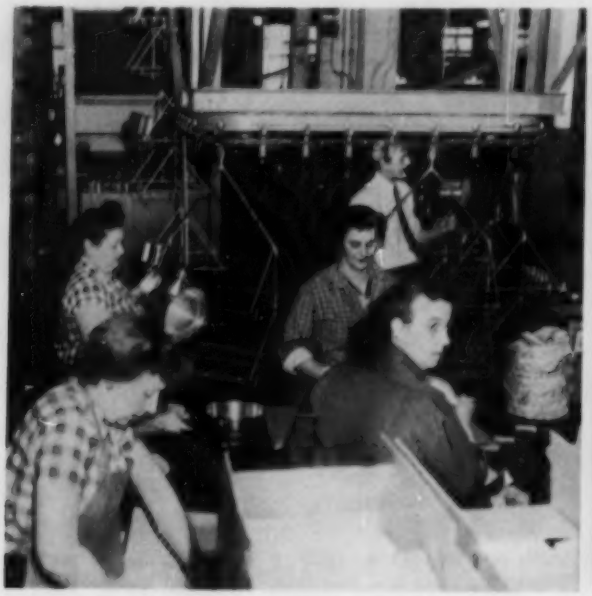
Shells are brought to 1600° F in the hardening furnace. When they come out, they drop into an oil quench (130° F) for three minutes. They move across the quench tank, lift and enter the draw furnace where they're brought back up to 1150° F. Total cycle time is 2¾-hours

close control of heating is critical. A cold spot on one side of the shell would cause the punch to drift. Concentricity tolerances couldn't be held. Three heat control zones in the forge furnace and perimeter heating in the retarded cooling furnace are keys to this precision.

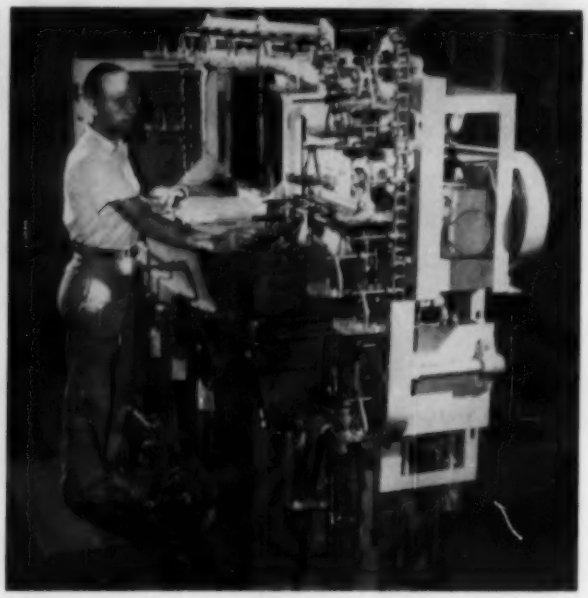
In Low Gear—The plant has four complete production lines. Only in heat treat does it narrow to two. One line is in production. The others are ready to go when peak plant production is called for. Production figures are closely guarded, but it's known that the lines can out produce original estimates.



Both rough and finish machining departments are served by May-Fran chip removal systems. Chips fall from the machines onto conveyors, are moved along the lines and out of the plant. This hopper services rough machining; it has a double crusher to handle chips. Forty-two lb of steel is taken off each shell in rough machining alone



This aluminum ware (left) is getting a final degreasing to remove buffing compound before packaging



The costume jewelry (right) is cleaned, including tiny crevices, as the last operation

Get the Most Out of Vapor Degreasing

By CHARLES E. KIRCHER & T. J. KEARNEY
Detrex Corp.
Detroit, Mich.

For Cheaper Degreasing

1. For good cleaning and drainage, place parts properly
2. Use a fixture or basket design that will not carry out solvent nor interfere with the cleaning
3. Don't use abrasive or refractory materials for fixtures or hooks
4. Pay particular attention to heavy coatings of paints, varnishes and similar materials on racks or fixtures. They dissolve and load up solvents

YOU may not be taking full advantage of this process. The chart opposite will give you a pretty good idea of where you stand.

Here are some tips that will help you get more mileage out of your degreasers on the production line.

Choose the right equipment. Look for features that provide easy maintenance. The solvent should be checked and replaced periodically; sumps, coils and lining should be cleaned of sludge. Thorough cleaning is important because worn-out solvent, plus soils, can cause acid formation, which contributes to wear.

Chemical Facts — Stabilized trichlorethylene is the solvent used in most degreasers. Stabilizers are added by the manufacturers to prevent formation of acid.

Two types are in general use—alkaline and neutral. The alkaline system uses an amine and an antioxidant; the neutral system uses a nonalkaline acid acceptor and an antioxidant.

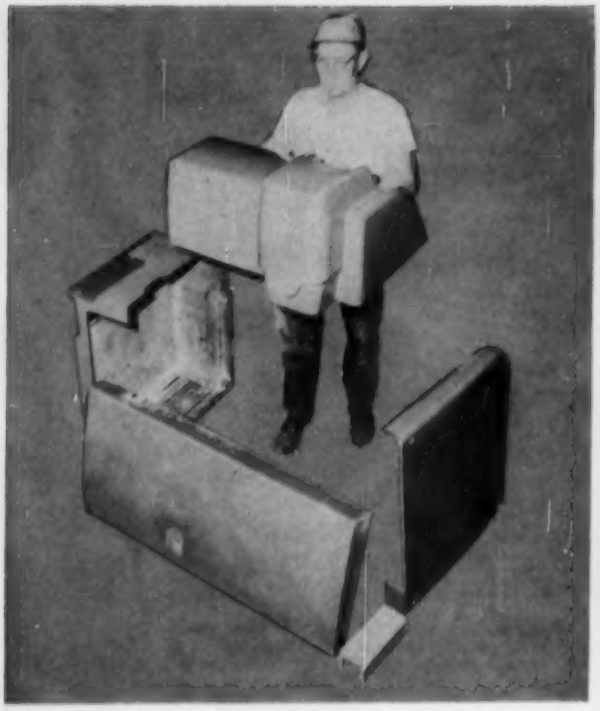
Testing — Don't operate a degreasing solution in an acid condition. Simple titration will determine how much amine (alkaline) stabilizer is left in a solvent. Neutrally stabilized solvents can also be checked.

When pH measurements are used as a part of process control, remember that only amine-type materials can account for a pH value above seven when measured in an aqueous medium (seven is neutral). Several acid materials will account for a pH value below seven. Remember also that the pH of a reclaimed distillate can differ appreciably from the pH of the original solvent.

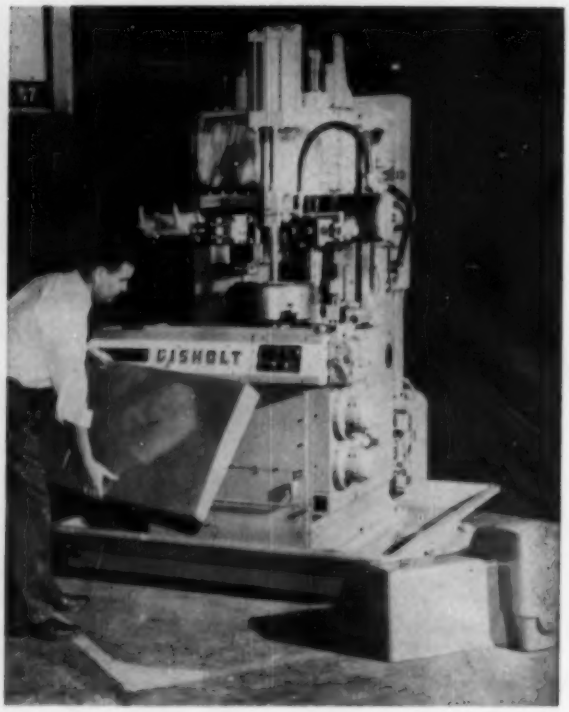
Expert knowledge of the chemistry of solvents isn't necessary for the production operation of a degreaser. If you're having trouble, get help from your supplier.

Guide for Vapor Degreasing

Part	Cleaning Needs	Equipment	Advantages
Refrigerator components	Reduce residual metallic or abrasive soil to a minimum. Requires removal of oils, chips, honing, grinding and lapping compounds	Monorail and crossrod vapor-spray-vapor degreasers, plus ultrasonics	Dry, spot-free work. Minimum residual soil. Adaptable to all methods of handling
Automotive engine hydraulic pumps, valve lifter bodies	Remove cast iron dust, chips, graphite, abrasive-oil residues	Monorail and crossrod vapor-spray-vapor degreasers, plus ultrasonics	Dry, spot-free work. Minimum residual soil. Adaptable to all methods of handling
Buffed aluminum cooking utensils, electric frying pans	Remove buffing compounds—no soil on packaged part	Vapor spray degreasers	Dry work. Elimination of water spotting. No possible etching. Only one, nonflammable solvent used
Transformer cases (spot welded stampings)	Remove all oil held in overlapping, spot welded seams	Immersion degreasing which can be incorporated into automatic processing equipment, providing cleaning, application of paint bond, rinsing and drying prior to painting	100% oil removal on overlapping seams. Prevents oil bleeding during phosphate coating and paint backing
Automatic transmission parts	Remove oil and chips from all surfaces, and from cored and machined oil passages	Either immersion and/or spray degreasing, slushing. In some cases ultrasonics	Trichlorethylene penetrates and can be flushed or ultrasonically agitated through oil passages
Hydraulic pump parts	Clean before final inspection or assembly	Monorail or crossrod vapor-spray-vapor degreasing; ultrasonics for lapped or honed cast iron surfaces	Dry spot-free work. Minimum residual soil. Adaptable to all methods of handling
Diecastings—carburetors, fuel pumps, aircraft and automotive parts	Removal of oil, chips, particularly from drilling and lapping operations	Crossrod, conveyorized immersion or vapor-spray-vapor degreasing equipment	Removes all oils, (vegetable or mineral) without chemical attack on parts. Provides spotless drying
Thin tube heat exchangers for refrigerators and air conditioners	Complete removal of oils and light soils from both the exterior of the heat exchanger and the interior of multiple tubes	Special degreasing equipment incorporating means of flushing interior of tubes in conveyorized equipment	Ability to clean in one conveyorized unit, plus ability to provide distillate for final rinsing of tube interior
Gears	Removal of quenching oils after hardening, removing of lapping and buffing compounds	Conveyorized degreasing equipment. Recommend use of ultrasonics on work such as buffed and lapped gears	Compact, hand operated and conveyorized equipment, easily adaptable to production requirements
Printed electric circuits	Cleaning copper coated laminate prior to application of stop-off and final cleaning after etching and rinse	Conveyorized vapor-spray-vapor degreaser	Rapid cleaning. Elimination of water spots, no effect on laminate
Aircraft frame components	Complete oil removal, various aircraft skins and reinforcing members	Hand operated, elevator type and other conveyorized degreasing equipment	Complete oil removal from all types of aluminum and aluminum alloys without etching or staining. Drying without water spotting
Costume jewelry	Removal of buffing compounds from intricate designs and patterns	Vapor-spray-vapor degreasing equipment, plus ultrasonics	Elimination of hand labor; production uniform, quality high
Surgical-medical equipment—hypodermic and surgical needles	Complete removal of buffing compounds, fine abrasives	Ultrasonic degreasing equipment incorporating both immersion and spray cleaning	Small, compact equipment
Instrument components	Complete oil, dust and metallic particle removal	Hand operated or conveyorized degreasing equipment, depending upon production requirements	Economical, compact designs even when production requirements are small



Five reinforced plastic panels house the motors on a vertical automatic lathe



Total weight of the panels is about 37 lb. In cast iron they would weigh over 300 lb

Plastic Housings for Machine Tools

MACHINE TOOL housings made of reinforced plastic and produced with plastic tooling cut costs 20 to 40 per cent on this item for a machine tool builder.

The housing fabrication method, developed by Gisholt Machine Co., Madison, Wis., uses plastics throughout the production cycle. Molds and fixtures are made with a tooling plastic; housings are polyester resins, reinforced with Fiberglas.

Example—An average-size housing for a machine tool, weighing 10 lb in reinforced plastic, might cost $8 to $9, depending on the size and complexity of the piece. In cast iron, the same piece would weigh 80 to 100 lb because of the thicker wall section needed to pour the casting; it would cost at least $12.80 as a raw casting.

Gisholt estimates that plastic housings cost 20 to 40 per cent less than sheet steel or cast steel housings, 20 to 35 per cent less than cast iron and 30 to 35 per cent less than cast aluminum.

Cuts Finishing Time—Less machining time is required for the plastic housing because it comes from the mold with a finished surface ready to be trimmed and sent to storage. The molds also double as tools to position the housing for routing and trimming.

Epoxy and polyester resins resist acids, grease, oils, moisture and most chemicals used by the machine tool industry. They have good electrical characteristics and mechanical strength. The housings are self-extinguishing, do not warp or change their shape under most weather conditions and resist the abrasion of flying chips and shavings.

Lathe Parts—All-plastic production saves about 30 per cent of the cost of housing parts for a vertical automatic lathe.

To fabricate the housing, a release agent first is applied to the mold surface. Fiberglas cloth is laid up in strips in the mold and polyester resins are brushed on.

Double Duty—The mold cavity is covered with a translucent film bag; air is withdrawn and atmospheric pressure forms the plastic in the mold. The resin is hardened by infrared lamps. The mold also serves as a fixture to trim the rough edges of the housing.

The five panels to house the lathe motors come from the mold with a surface that requires no further finishing. Total weight of the panels is about 37 lb. In cast iron they would weigh over 300 lb; in aluminum, about 120 lb.

Tool plastic epoxy compounds are supplied by Rezolin Inc., Los Angeles. Polyester resins for the housings are supplied by Bakelite Co., division of Union Carbide & Carbon Corp., New York.

HOW CMP RESTRICTED SPECIFICATION

COLD ROLLED STRIP STEEL CUTS MATERIAL AND END-PRODUCT COSTS . . .

Putting a stop to troubles with cold rolled strip steel has long been the specialized business of CMP.

By working to restricted specifications for size, characteristics and finish, CMP precision rolling and processing has helped in many ways to reduce slow downs in production with flat rolled steel.

The danger of not having steel with the "working qualities" that will keep up with todays high speed automatic machines can be eliminated. In many cases a CMP restricted specification strip has simplified tooling and stepped up machine speeds 25% or more.

And when the free flow of CMP strip is moving through your equipment without difficulty you'll know why your end-product costs are at the right level — why it pays to always check CMP for the right specification wherever cold rolled strip steel is needed. Your inquiry is invited.

CMP WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

- LOW CARBON
- HIGH CARBON
  Annealed or Tempered
- STAINLESS
- ALLOY
- ELECTRO ZINC COATED

the Cold Metal Products co.

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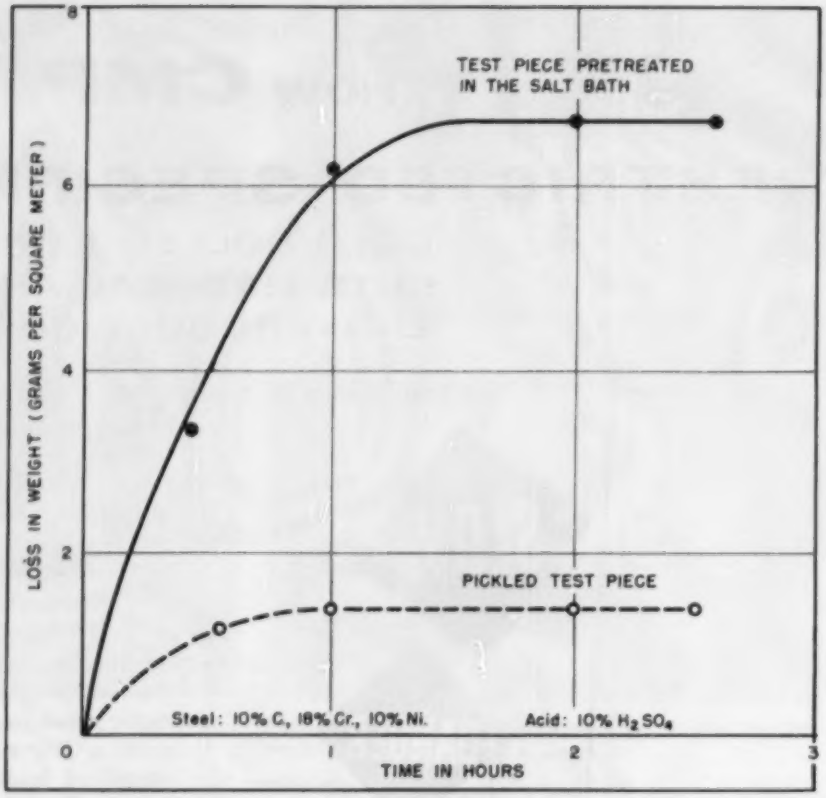
No Acid in This Pickle Line

Stainless and heat resisting steels turn bright after special salt bath and atmosphere heating. Working properties are comparable to acid-pickled alloys



Even though corrosion of chemically treated sample is faster in the first 1½ hours, metal loss is equal to that lost in acid pickle to begin with. Corrosion comparison favors neither method

NEWS of an acid-free pickling process comes from Germany.

It is designed to treat stainless and heat resisting alloys, where complete removal of scale between rolling operations is a must. These chrome-rich steels require large volumes of strong acids, which, in turn, multiply handling and disposal problems.

The Solution—The process starts out like the fused-salt, acid-pickle method—the alloy is pretreated in molten salts. Pretreatment transforms the scale to a product that is more soluble in mineral acids, but the system still requires acid.

The German process takes the pretreated alloy and passes it through a reducing-atmosphere furnace which converts the surface into bright, clean metal.

It is interesting to note that purity of the reducing gas in the furnace can be quite low, since the salt bath de-chromes the scale and the upper atomic layers of the metal surface.

How It's Done—While no positive information is available to show how the scale transformation takes place in the molten salts, the reactions probably look something like this:

$$2(FeO \cdot Cr_2O_3) + 7NaNO_3 = Fe_2O_3 + 4CrO_3 + 7NaNO_2$$

$$Fe_2O_3 + 4CrO_3 + 14NaOH = 2Na_2FeO_3 + 4Na_2CrO_4 + 7H_2O$$

$$2(FeO \cdot Cr_2O_3) + 7NaNO_3 + 14NaOH = 2Na_2FeO_3 + 4Na_2CrO_4 + 7H_2O + 7NaHO_2$$

The chromate formed is absorbed by the caustic soda-saltpeter fused bath and becomes enriched. Manganese, silicon, titanium and molybdenum oxides in the scale do the same thing. Only the fairly insoluble oxides, such as iron, nickel and copper, remain behind.

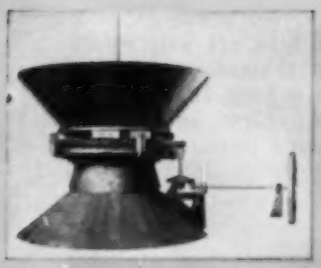
Instead of removing these brownish-black oxides in acid, the German system reduces them in a cracked ammonia or bottled hydrogen atmosphere furnace. As it leaves the furnace, the product has almost a mirror finish and is metallurgically clean. Instead of losing the iron and nickel contents of the scale to the acid, both are recovered as a thin coating of pure iron or iron-nickel alloy. The coating is so thin and adherent that after a few minutes of heating, it can no longer be loosened.

Corrosion Resistance—No matter how good the process is, the

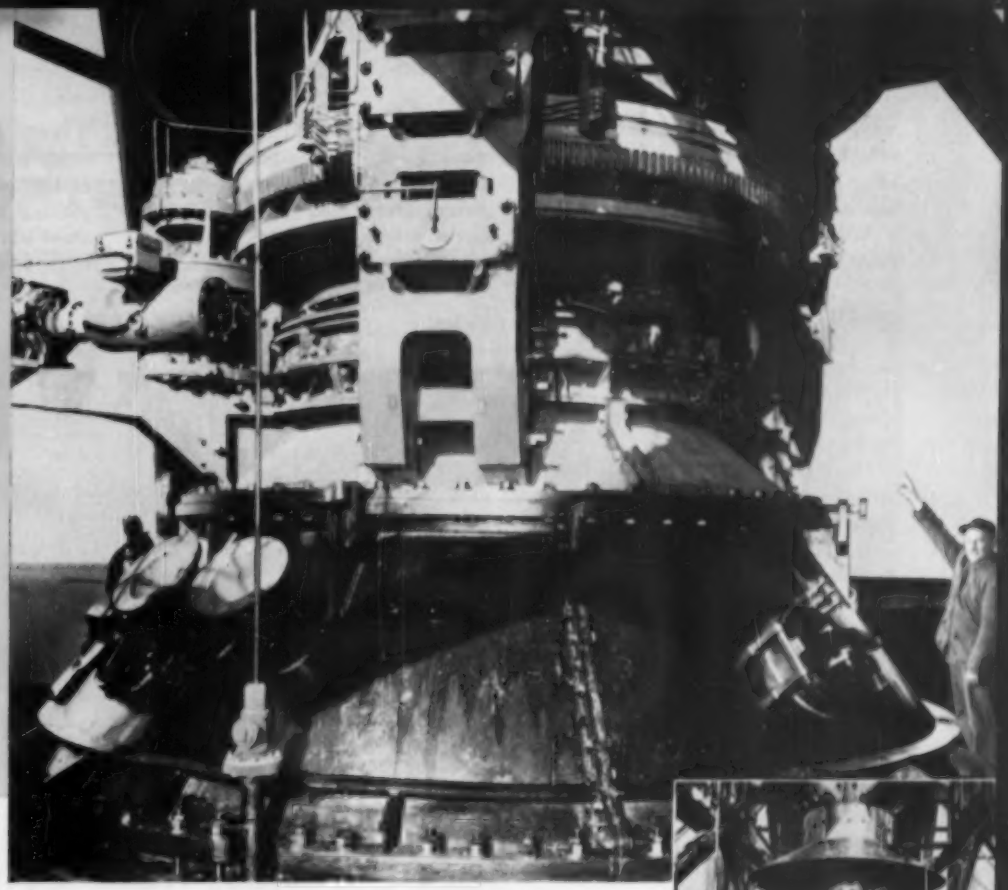
Table I

Service Life—Short Test on Electrical Resistance Wires

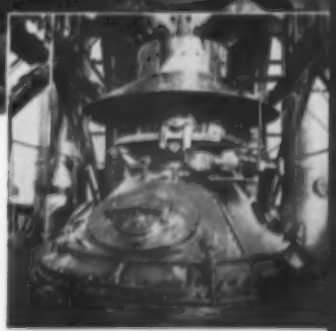
Resistance alloy with	Service Life at 1050° F	
	Normal Treatment	Surface Dechromed
80% Ni, 20% Cr	9,500 heating cycles	9,260 heating cycles
30% Ni, 20% Cr	3,860 heating cycles	3,820 heating cycles



"BABY PICTURE." This photo was made in 1906 when the McKee Distributor was only one year old.



1955 MODEL. McKee Heavy-Duty Distributor for largest Blast Furnaces.



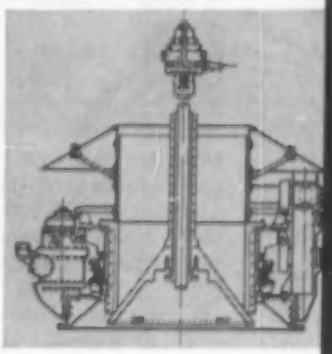
STANDARD MODEL. This is the McKee Distributor that has been virtually standard equipment throughout the industry for half a century.

Portrait of the McKEE BLAST-FURNACE DISTRIBUTOR on its 50th Birthday . . .

Many changes and improvements have been made in the McKee Blast-Furnace Distributor since 1905, but one thing about it has never changed —that is its universal acceptance as the standard of the industry.

In the course of fifty years of designing and building all types of plants and facilities for the production of iron and steel, 446 McKee Distributors have been installed in blast furnaces throughout the world.

The high quality of engineering and construction, which has kept McKee Distributors literally "on the top" in blast furnaces for half a century, has also earned for the McKee organization a position of unquestioned leadership in engineering and construction of blast furnaces, open-hearth shops, rolling mills and facilities for the preparation of raw materials.



ON THE WAY. McKee is developing a new distributor, for smaller, existing furnaces, which will incorporate all the best features of the heavy-duty model.

50th ANNIVERSARY

McKee Engineering Services

Arthur G. McKee & Company • Engineers and Contractors

Headquarters: McKee Building • 2300 Chester Avenue • Cleveland 1, Ohio
Offices: New York, N. Y. • Union, New Jersey • Washington, D. C.
British Representatives of Metals Division: Head, Wrightson & Co., Limited
Canada: Arthur G. McKee & Company of Canada, Ltd., 350 Bay St., Toronto

vital consideration remains: What effect does it have on corrosion and heat resisting properties of the alloys?

Test results under identical corrosion conditions showed that the pickled specimen lost less weight in the first 2 hours of exposure. The difference turned out to be exactly the weight of the iron and iron-nickel coating which the acid-treated pieces didn't have in the first place.

Once that coating had been corroded away, the behavior of the samples was identical.

Heat Resistance—For comparison, wires of electrical resistance alloys (80 per cent nickel, 20 per cent chromium; and 30 per cent nickel, 20 per cent chromium) were tested in the normal condition (bright annealed) and the salt bath descaled condition.

Test results (see table) indicate that descaled specimens compared favorably with the bright annealed samples. Values given are averages from each of five measurements. In the first hours of test, the surface of the descaled wires is darker than the bright annealed samples, but as more chrome diffuses to the surface, the two take on a similar appearance.

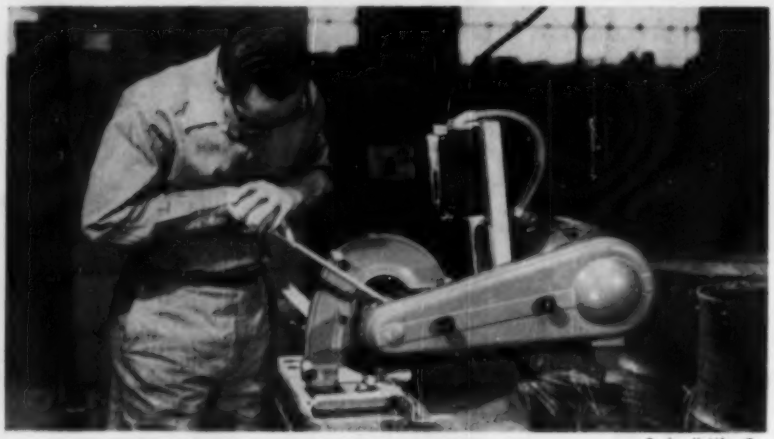
Drawing Advantage—If wire is to be drawn, the time spent in the reducing furnace is cut to the minimum. The iron or iron-nickel coating on the surface facilitates drawing by acting somewhat like copper or lead coatings. As the wires pass out of the heating furnace, they can be limed or phosphatized, then drawn.

Aside from de-chroming surface scale, the salt bath removes lubricant traces and their carriers. Considerable difficulty is had with these residues in normal degreasing baths, especially with wire in bundles. With this treatment, the operator can choose any lubricant.

Clads Well — With salt bath treatment there is no necessity for shotblasting, grinding or pickling sheets for cladding. Cover sheets and cladding are treated for 15 to 20 minutes in the salt bath, quenched in water, rinsed and passed to the cladding furnace.

With the dark-colored transformation coatings still on the surfaces, the cladding packets are brought up to temperature, and the coatings are reduced to the chrome-free iron or iron-nickel layers which hinder oxide formation during the rest of the heat ups.

Such surfaces are surprisingly receptive to the cladding union. Examination of an 18 per cent chrome steel clad on an unalloyed sheet showed a typical clean transition and a close, defect-free union of the two metals.



Rockwell Mfg. Co.

Get the Most from Cutoff Machines

NEARLY EVERY manufacturer of metal products has use for a cutoff machine. Because of its relative newness, the tool is sometimes misused, say technicians of Delta Power Tool Division, Rockwell Mfg. Co.

Proper use of the machine often lies in choice of wheels. For hard materials, a soft grade of wheel is used: Hard materials tend to dull the grit more rapidly; a soft bond tears away to expose sharp grit.

Ferrous Metals—Best results are achieved with ferrous materials by feeding the wheel into the work as fast as possible. Feeding pressure should be applied steadily after the wheel is in contact with the work but not enough to slow the wheel appreciably. The faster the wheel is fed through the work, the greater the wheel life.

When cutting high carbon steel which subsequently is to be machined, work-hardening of the surface may occur. Wet cutting is often the answer.

Nonferrous — While copper, brass, aluminum and other nonferrous metals can be cut with abrasive wheels, it is often more advantageous to use a high-speed, metal-cutting saw blade in the cutoff machine. Blades, made of high-speed steel or of high-carbon, high-chrome alloy of low filing temper, are hollow ground for good clearance. They should be kept sharp at all times.

At 2000 rpm the saw blade cuts nonferrous metals faster than an abrasive wheel and practically eliminates the burr which plagues the cutting of soft materials. Though initial cost of a blade is greater than for an abrasive wheel, service life is much longer.

Shape—This will influence wheel choice. For example, a softer wheel should be used for solid stock than for tubular stock. Tubing presents a small contact area to the wheel, and the higher unit pressure tends to break the bond down rapidly.

In cutting round material, both saw blade and abrasive wheel have a tendency to rotate the work. This can cause spoilage or crowd and damage the blade or wheel. A simple clamp for holding down the work is especially valuable in making angular cuts.

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THE SHORTEST DISTANCE BETWEEN

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The straight-line pattern of J&L Jal-Tread raised cleats plus the strength and toughness of high quality steel combine to provide floor plate with both safety and economy.

Whatever your application . . . in new construction, new equipment or replacement, you'll find Jal-Tread offers you the shortest way to:

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For safe, long-lasting flooring always specify J&L Jal-Tread . . . *it's available at leading distributors everywhere.*

see our catalog in Sweet's ARCHITECTURAL FILE or write for copy

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

Only gloves and respirators are needed for protection from radioactive lime

Atoms Aid Wiremaking

IN PLATING or galvanizing cold drawn wire, the plating doesn't always stick.

To find out why, American Steel & Wire Division, U. S. Steel Corp., brought radioactivity into a field test this month.

The division's researchers (working with Battelle Memorial Institute) analyzed the problem this way: Lime and sodium stearate are used to coat wire before drawing. Before plating, the lubricants are removed by first oxidizing and then washing in dilute hydrochloric acid.

Problem — Does insufficient cleaning cause difficulties in plating?

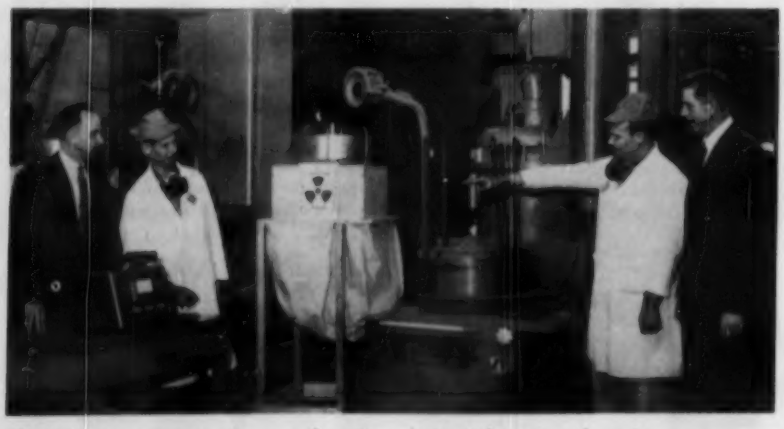
To find out, radioactive Ca $(OH)_2$ (made by irradiation in an atomic pile) was added to the lime used to coat the wire before drawing. Fortunately, Ca_{45} emits only beta rays, and only the simplest of safety precautions were needed.

Cloth hoods surrounded the wire uncoiler and the drawing dies. Fans at the hoods pulled air through a filter, so that the amount of radioactive dust could be measured.

Radioactivity on the wire was low—200 counts a minute, compared with a normal background of about 40 counts a minute. A radium dial wrist watch would give 25,000 counts a minute.

After the wire is drawn, it is cleaned. The radioactivity of the lime will make it possible to measure the effectiveness of the cleaning process. It will also tell if there is any correlation between the presence of lime on the wire and its plating qualities.

Later, presence of sodium stearate will be determined by making an activation analysis of wire sections in the laboratory.



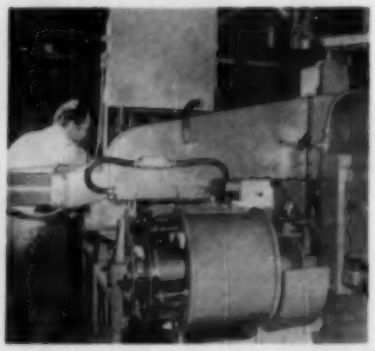
Cloth hoods protect where radioactive dust might enter the air

Cheaper Splines

Detroit applies the cold-forming technique to its rear axles and gets a stronger part for less

SAVED TIME, improved quality, reduced capital investment: That's what Ford did with its new cold-rolling operation on rear axle splines. After nearly a year of trial production, four Roto-Flo process machines are being tied in with the regular automation at the Mound road (Detroit) plant.

Changes — To increase production and reduce tool wear, Ford worked with the machine designers to change the rear axle spline from a 17-tooth to a 24-tooth design. Present production is 3800 splines per machine per day; forming racks (tooling) need changing and regrinding only once every 39 working days. Michigan Tool Co.'s engineers who designed the Roto-Flo process expect even better tool life as newer alloy steels are tried.



COLD-FORMING SPLINES

. . . rear axles on Roto-Flo conveyor

Labor Cut—Because it adapts to automation so easily, cold rolling cut Ford's direct labor costs. No chips are produced by this method.

It's hard to beat the improved 3 to 6 microinches produced by cold rolling. Cold working also produces a flow pattern that improves tooth strength.

No additional heat treatment is required either. Both cycle time and method (induction) remain the same.

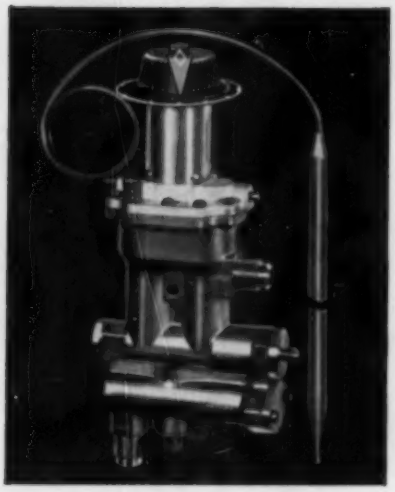
A side advantage of the spline redesign is the additional shaft strength gained from a 15 per cent greater shaft cross section.

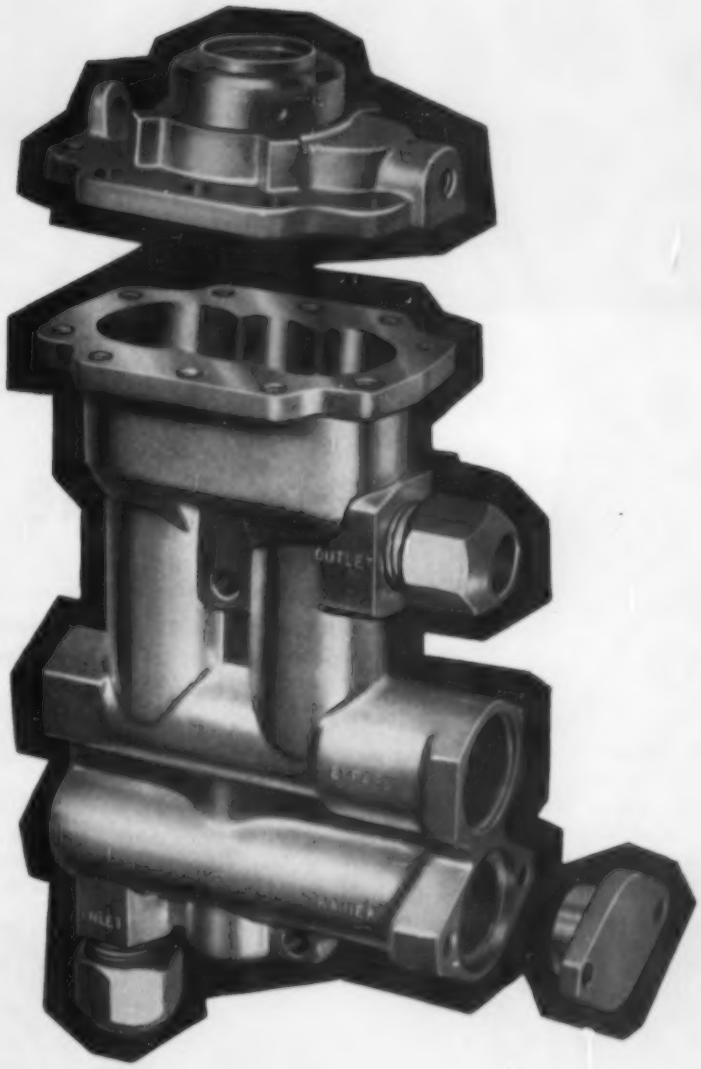
manufacture of

DETROIT SELECTAFLOW CONTROLS

greatly improved by

MUELLER BRASS CO. FORGINGS





One of the finest thermostat control mechanisms for year-around air-conditioning systems is the automatic SELECTAFLOW, a product of the Detroit Controls Corporation. To maintain the high quality of this efficient unit and at the same time speed up and simplify assembly, the body, bonnet and side cover are being forged and completely machined to close tolerances by the Mueller Brass Co. In all, thirty-four machining and finishing operations are performed. This is but one more example of how Mueller Brass Co. machined forgings have improved a product and speeded production. With a wide range of copper-base alloys for forgings, a tremendous background of product engineering, and facilities for precision finish machining, the Mueller Brass Co. can supply machined brass or bronze forgings to *your exact specifications*. It will pay you to consider Mueller Brass Co. forgings for your new or redesigned products. Write us for full color catalog and technical information.

MUELLER BRASS CO. STREAMLINE PRODUCTS

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

Finished welds made by the four-at-a-time welder. Inserts are forgings to accommodate materials handling equipment

Four-at-a-Time Welder

Fixturing, plus pantograph-type control, gives new life to production. Uniform quality, better materials handling are plus features of this welder setup

A MERRY-GO-ROUND under multiple welding heads on a pantograph-type tracer speeds production at Walsh Construction's Portland (Me.) plant. The automatic cutting, beveling and welding of forged inserts to steel casings has set production records.

The product is a steel casing, ⅜-in. thick and 16 in. in diameter. Two forged inserts (one is 3 in. in diameter, the other is a 3 x 11 in. oblong) are arc welded into the casings to provide handles or lugs for materials handling equipment.

The electronic controller (upper right) guides the multiple cutting heads around a circle and an oblong. Heads are preset to produce a cut with 20-degree bevel

The merry-go-round is an indexing worktable with five stations. Each accommodates four casings. The first station is for loading; second, cutting and beveling; third, positioning and tack welding the forged inserts; fourth, argon shielded arc welding; fifth, unloading.

Cutting and Beveling—Holes are cut four at a time with flame cutting heads mounted on a pantograph called an Oxygraph. An electronic tracer guides the machine around the contour for the inserts. The cutting heads are preset to produce a 20-degree bevel as the cut is made. Racks for each head


50 Years
of Progress
50
VANADIUM CORPORATION OF AMERICA

Since the discovery of Mina Ragra fifty years ago – the world's richest vanadium mine – we have been absorbed in one of the most fascinating occupations in industry: the development and production of ferro alloys, metals and chemicals. Working closely with the metals and chemical industries and other progress builders, we contributed to many of the engineering achievements of our day: jets . . . automobiles . . . machine tools . . . mining, construction and agricultural machinery and scores of other products that range from sleek, swift streamliners to tough, heavy-duty synthetic fibers.

We were privileged to take part in these and numerous other developments in the past half century, for their success depended in part on the ferro alloys, metals and chemicals which VCA helped pioneer and produce. Now . . . on the occasion of our fifty years of service to the Metals Industry, we look ahead to . . .

THE NEXT FIFTY YEARS . . .

To assure a steady, continuous supply of raw materials, we have expanded our mining operations. We have enlarged and modernized our milling and smelting operations. We have recently built two new plants. And plans are now under way for the construction of a third, designed to meet the ever-increasing need for Vancoram ferro alloys. We have built a new Research Center – one of the finest of its kind to be found anywhere – for the important work of developing new and improved Vancoram products and assisting customers in the solution of their alloy problems.

Looking ahead to the next fifty years, there will be a need to develop special alloys, metals and chemicals to meet the requirements of the jet and atomic age. Our Research Center is already at work on these and other important problems in every phase of our technology. All this to achieve a goal: to serve the Metals Industry better than we have ever served it before.

VANCORAM

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420 Lexington Avenue, New York 17, N. Y.

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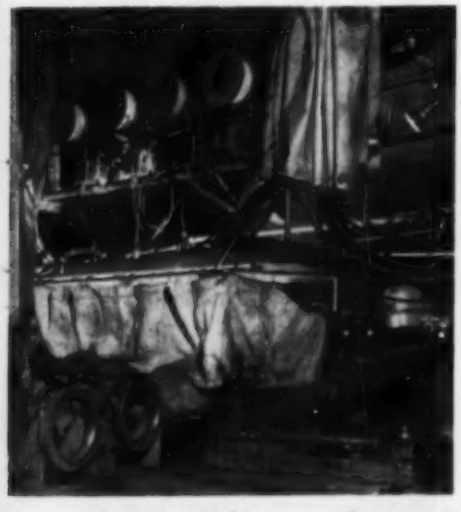
These cuts require no further work before forged inserts are tacked by hand at the next station. Work is kept in this position through five stations

provide vertical adjustment by direct or remote control.

Welding — Standard, inert-gas-shielded arc welding heads are mounted on a second Oxygraph at the fourth station. It is guided by a magnetic tracer.

Head motors for the arc heads are stationary and are mounted separately above. The entire station is shielded by asbestos curtains.

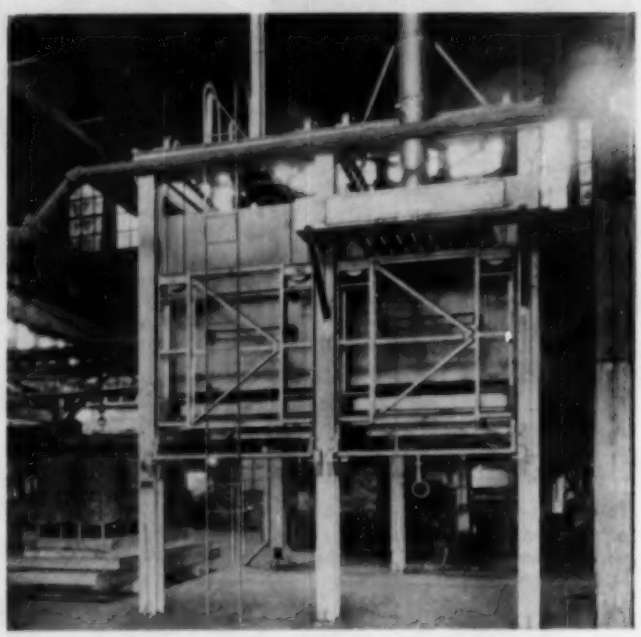


At station 4, the upper asbestos curtains have been pulled aside to show the head motors and wire reels for the four, argon-shielded arcs behind the lower curtains

No. 21 in STEEL's Modern Heat Treating Series

Heat Treating To Produce Malleable Iron

By JAMES H. LANSING
Technical and Research Director
Malleable Founders' Society
Cleveland



Two-chamber, elevator furnace of the electric, batch type

HEAT TREATING turns hard, brittle, white iron castings into malleable castings, which are tough, ductile, impact resistant and easily machined. In white iron, all carbon is in combined form. In malleable, it is free, interspersed throughout the matrix of ferrite (carbon-free iron) as nodules of temper carbon.

Malleable iron is used in automotive steering gear housings, differential cases and carriers, railroad car brake parts, electrical power transmission components, pipe fittings, conveyors and in many other applications. Its design adaptability saves metal, machine time and man-hours.

Scope — This article will deal with standard malleable iron, which is covered by the American Society for Testing Materials' standard specification A 47-52. Minimum tensile test requirements are: Grade 32510—yield point, 32,500 psi; ultimate strength, 50,000 psi; elongation, 10 per cent in 2 in.; grade 35018—yield point, 35,000 psi; ultimate strength, 53,000 psi; elongation, 18 per cent in 2 in.

Heat treating to produce pearlitic malleable, another useful malleable foundry product, will be covered in an article on Dec. 26.

Prerequisite—Before white iron can be completely malleableized, in general it must have this composition:

Carbon—At least 2 per cent, but not over 2.6 per cent, so all of it may be in the combined form.

Silicon—At least 1 per cent to help malleableizing, but not over 1.5 per cent, so the carbon-silicon total will not prevent the iron from being wholly white on solidification.

Sulphur—At least 0.05 per cent, but not over 0.18 per cent.

Manganese—At least 0.25 per cent, but not over 0.50 per cent to prevent stabilizing the carbide by an excess of manganese beyond that needed to form manganese-sulphide. (Generally, manganese is adjusted in relation to the sulphur on the basis of twice the sulphur, plus 0.15 per cent.)

Phosphorus—At least 0.05 per cent, but not over 0.16 per cent. High phosphorus, plus relatively high silicon, may reduce low temperature impact values. (Phosphorus usually is adjusted in relation to the silicon. For example, 0.05 to 0.10 per cent phosphorus goes with silicon of 1.35 to 1.50 per cent; 0.10 to 0.15 per cent phosphorus with silicon of 1.00 to 1.10 per cent.)

Added Elements — A small amount of boron in white iron, 0.001 per cent or even 0.0005 per cent, facilitates graphitization in the annealing process. Boron may be added to the molten metal as ferroboron, or may be included in the furnace charge (silvery pig and ferrosilicon).

The white iron from which malleable is made may be "direct melted" in a reverberatory air furnace or "duplex melted" in a cupola-air furnace or cupola-electric furnace tandem.

Advantages—In duplex melting, using the cupola as the first unit, at least one-third of the charge is steel scrap. This has the advantage of using a component low in sulphur, phosphorus and carbon. Generally, however, the chromium content is higher than in the direct-melted metal which contains more pig iron and little or no scrap.

With chromium content up to 0.03 per cent or slightly higher, no difficulty normally is encountered in the anneal owing to the carbide stabilizing effect of chromium. Since chromium generally runs slightly over 0.03 per cent in duplexed metal, boron usually is kept close to 0.001 per cent to offset its effect. High boron is avoided because it tends to produce a lace-like

arrangement of the carbon nodules. This decreases the mechanical properties of the malleable product.

Metallurgy of Anneal — White iron castings at room temperature consist of free cementite in a matrix of pearlite. In the malleable anneal, as they are heated to just above the critical temperature (between 1330 and 1370°F), the pearlite is transformed to austenite — a solid solution of cementite in iron. The amount of carbon in austenite depends on the temperature because the solubility of cementite in austenite rises as the temperature increases.

First Stage—Austenite held at high temperature for a considerable time will precipitate some of the carbon (which was in the cementite) out of solid solution in the form of temper carbon. Reason: The austenite has dissolved all the cementite it can at that temperature. Then the austenite, no longer saturated with cementite, dissolves more. These two reactions, the dissolving of cementite and the precipitation of carbon by the austenite, proceed simultaneously.

As the iron is held longer at the given temperature, more and more carbon is precipitated by the austenite, and more and more cementite dissolved, until all the free cementite is dissolved and most of the carbon precipitated. At this point, first-stage graphitization is complete. Because the temperature is held constant to effect the solution of cementite and precipitation of temper carbon, the heat at which first-stage graphitization takes place is called "first-stage holding temperature."

The higher the holding temperature, the more rapid is the solution of cementite in austenite. However, higher temperatures are more costly, may give warped castings and may have an adverse effect on mechanical properties. For these reasons, first-stage holding temperature is generally in the range of 1550 to 1750°F.

Second Stage—To complete the anneal, it is necessary to convert the remaining austenite into temper carbon and ferrite. "Second stage graphitization" takes place at, or slightly below, the critical range of 1330 to 1370°F.

When the temperature is lowered from that used in the first-stage treatment, the solubility of cementite in austenite decreases. In practice, the temperature of the castings is lowered as fast as practical for the type of oven used, until about 1400°F is reached. During this preliminary cooling period, more carbon from the austenite is precipitated upon the existing nodules.

Temperature Control — From about 1400 to 1300°F, a slow rate of cooling should be used, because the metal is passing through its critical range. Generally, the rate of cooling here should not exceed 10°F per hour—preferably slower.

At this point the austenite is of eutectoid composition (a solid solution or alloy of constituents which will cool without further change in composition). The austenite is unstable, and as the temperature of the castings drops through the lowest critical point, the tendency is for it to revert to pearlite. This transformation is opposed by the relatively high silicon content of the metal and the slow rate of cooling.

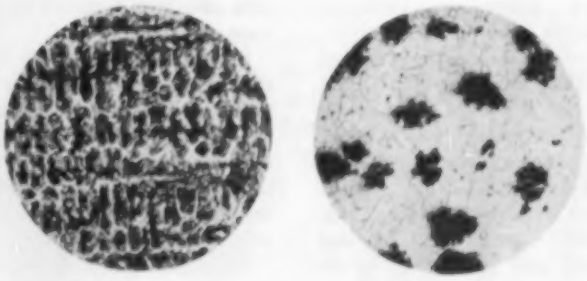
Under the critical temperature, some pearlite may be formed, but on holding at a temperature just under the range, the cementite of the pearlite spheroidizes and, in time, decomposes into ferrite and temper carbon. To effect complete precipitation of the carbon, a slow rate of cooling to about 1300°F, or a holding period just below the critical temperature, may be required.

Ferrite Formation — Ferrite, which is characteristic of malleable iron, does not appear until castings have cooled to the critical range. In irons cooled rapidly from temperatures around 1380°F, ferrite first begins to grow around the grain boundaries and adjacent to the carbon nodules which have a local "decarburizing" effect.

As the temperature slowly decreases, the ferrite develops and begins to appear as "bull's eyes" around the temper carbon nodules. When the structure consists entirely of temper carbon nodules in a matrix of ferrite, second-stage graphitization is complete.

If the first-stage holding time and/or temperature are insufficient, some cementite will remain in the castings. If the second-stage cooling or holding time through the critical range is insufficient, some pearlite will remain.

Cooling—When the second-stage is complete, the castings may be cooled rapidly to room temperature. Depending on the type of heat-treating equipment used, final rapid cooling may or may not be feasible. Unless phosphorus is low, in relation to silicon, rapid cooling from 1200 or 1150°F is desirable. It helps to immunize castings against possible reduction in impact value if they are galvanized or against a somewhat similar effect of too rapid or too slow cool-



Structure of the original white iron (left) is crystalline. It consists of white cementite (Fe_3C, carbon combined chemically with iron) in a matrix of dark pearlite (a mechanical mixture of ferrite and cementite in alternate layers). Malleable iron (right) has a matrix of ferrite (carbon-free iron) containing uniformly dispersed nodules of temper carbon.

ing in the lower temperature blue-heat range.

The temperatures with which we have been dealing are those of the castings. If the load in the furnace is large, a pyrometer couple may not give the temperature of all castings until after an equalizing period. This means that with certain types of equipment a substantial "time safety factor" should be allowed before considering the anneal, especially the second-stage, complete.

Equipment and Cycles

Several types of furnaces, both batch and continuous, are used.

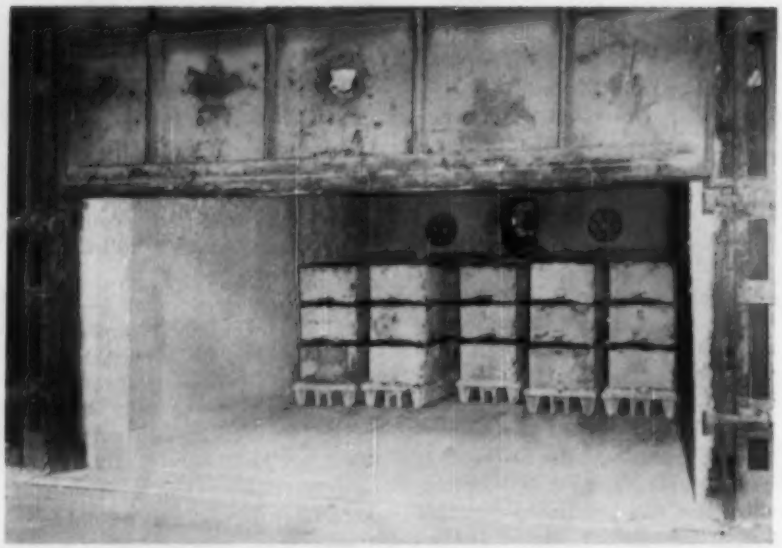
Batch Furnaces—These include the conventional pot type, muffle, car type and elevator-type furnaces. They can be heated by pulverized coal, oil, gas, radiant tubes or electricity.

During the anneal, castings must be protected against scaling and excessive decarburization produced by an oxidizing atmosphere. This can be done by annealing the castings in covered containers. The furnace atmosphere may be made nonoxidizing by sealing against air entry or by passing in gas.

Packing Material—The mass to be heated is greater and heat transfer is somewhat slower when packing material is used to prevent oxidation and warpage. Annealing time is longer, mainly during heat up and cooling to the critical holding temperature for the second stage, when castings are protected from the oven atmosphere by heavy containers and packing.

In Wide Use—The conventional batch-type annealing furnaces, built of brick, insulated and direct-fired by coal, oil or gas, are used widely. They generally hold about 20 tons of castings packed in stacks of protecting iron pots or boxes. Each pot is about 2 ft long, 2 ft wide and 1½-ft deep. It may be an open ring, in which case slag, silica pebbles or gravel are used to support and protect the castings, or each pot may have an integrally cast bottom.

In the latter case, no packing material is needed because each pot seals the top of the one beneath it. The top pot is covered by a plate. Also, the superimposed load on the castings in each pot is less. Three or four pots usually are stacked vertically upon a stack bottom or stool casting, supported by feet. This permits a fork lift truck to place the stacks of pots in the furnace, and helps circulation of the atmosphere.



Pot-type furnace fired by pulverized coal. Heavy containers protect castings against scaling and excessive decarburization

Heating Cycle—A typical treatment cycle is: Hold about 40 hours at 1600°F; cool to 1400°F in 15 hours; cool to 1275°F in another 15 hours; hold at 1275°F for 20 hours; then cool to a temperature at which the stands can be handled in another 15 hours. Total time is about 130 hours.

The temperature of the second-stage holding is 1275°F, rather than 1300°F (or higher) as indicated earlier. This is to equalize the temperature in the charge and allow for temperature lag in top pots and in the center of the furnace.

Electric and Radiant Tube—In electric or radiant-tube, batch-type furnaces, pots are not needed. Atmosphere in the electric type is not sufficiently oxidizing to scale the castings. In radiant-tube ovens, gas generally is used to prevent scaling.

Thus, the mass to be heated is less; heat transfer is faster. As a result, the cycle may be completed in about half the time needed for pot-type furnaces, especially if a high holding temperature is used in the anneal (1700-1750°F).

Elevator Type — Electrically heated, elevator-type furnaces generally have both high and low temperature chambers. The car is elevated into the high temperature zone for the first stage, then transferred to the low temperature chamber for the second stage. This saves time and heat.

A typical electric batch-type cycle using two furnaces, one high temperature or first stage, the other low temperature or second stage, is as follows:

1. Elevate loaded car into the high temperature furnace. At the end of 8 or 9 hours, the charge has reached 1760°F (furnace temperature) where it is held for 15 to 16 hours. The first stage is completed in a 24-hour day.

2. Drop the loaded car, transfer and elevate it into the low temperature furnace (takes about 2 minutes). Here the oven is at about 1320°F, having just had a 1320°F load removed from it. The high temperature load is about 1550°F when it goes into the second furnace. Aided by blowers and cooling tubes, the load will cool to 1400°F in about 4 hours. Then it is cooled at about 3°F per hour for 20 hours. The car comes out at about 1320°F. At the end of the second 24-hour day, the second stage in malleableizing is finished.

Exception—This cycle is applicable to most malleable castings. But for large, intricate parts, which might crack while still in the white iron state if heated too fast, slower heating to the first-

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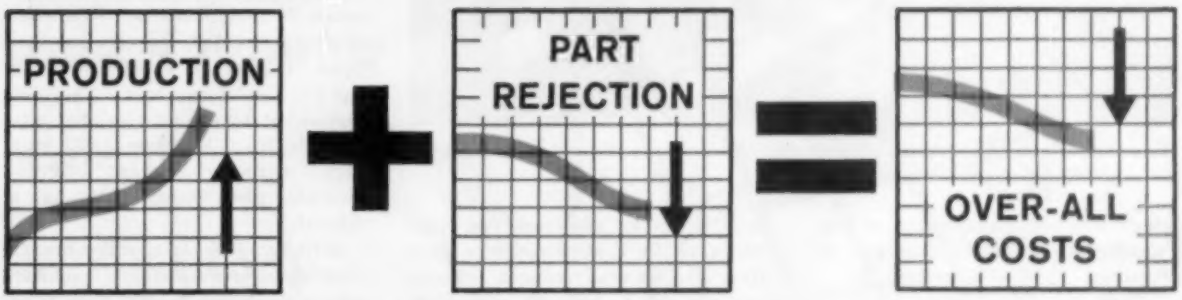

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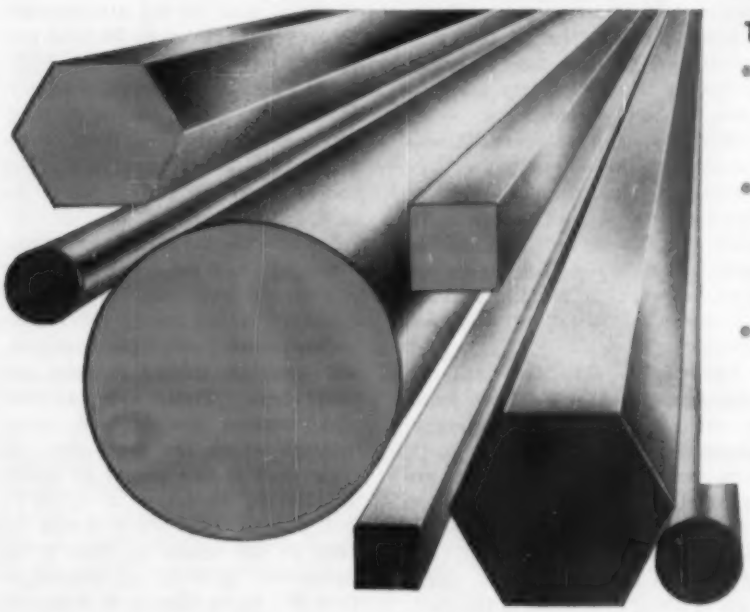

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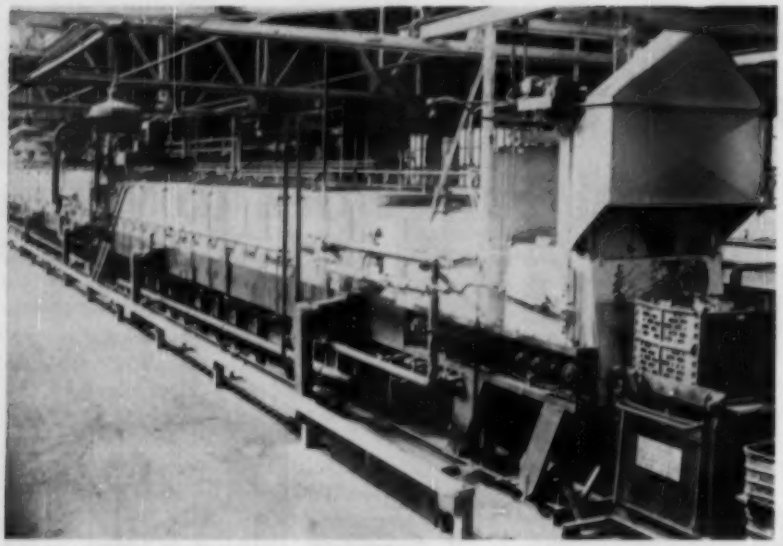

Electric, roller-hearth, continuous furnace. Advantages: High ratio of castings per container and short annealing time

stage holding temperature or preheating in another furnace may be required.

These electric furnaces have a sand seal between the car and the oven. No protection other than a tight oven is required. Castings come from the anneal free from scale. Power consumption ranges from 450 to 550 kw-hr per ton of castings with a charge of 6 to 10 tons.

Gas-Fired Furnace—A batch, gas-fired, radiant-tube furnace, holding 12 to 18 tons, using controlled atmosphere with no packing material, is operated on the following cycle: 8 hours to reach 1750°F; 16 hours at 1750°F; 3 hours to cool to 1400°F; 17 hours to cool to 1300°F. Total time is 44 hours.

When packing material is used to prevent warping, the cycle increases; 10 hours to reach 1750°F; 18 hours at 1750°F; 3 hours to cool to 1400°F; 21 hours to cool to 1300°F; 6 hours to, and at, 1275°F. Total time is 58 hours.

The fuel consumption for the shorter cycle is 4500-5000 cu ft of 1000 Btu gas. For the longer cycle, with packing, more fuel is required.

Radiant-tube, bell-type furnaces, which can be removed from their hearths to permit crane loading and unloading, are used for large castings, or ones which can be stacked several feet high.

Continuous Types — Radiant-tube, electric and car-type furnaces of the continuous type save time for several reasons. First, castings can be brought up to high temperature fast. This means the first-stage treatment is shorter due to the high temperatures used. Cooling to the critical range for the second-stage treatment is also faster. A shorter second-stage is possible due to temperature uniformity. Castings cool rapidly owing to the small lots and absence of heavy containers.

Most continuous installations handle substantial tonnages. In a small foundry, the possibility of slowdown to a point where sufficient tonnage is not available to keep a furnace in full operation must be kept in mind. Without full operation, the process is not efficient.

Favorite — Gas-fired, radiant-tube furnaces are the most widely used of the continuous type. Capacities range from 15 to 60 tons per 24-hour day. They are economical when low gas rates are available and work well where a large tonnage of castings of fairly uniform size and section thickness is being produced. If the castings are to be die straightened, possible warpage, due to lack of pot or packing material support, is not a factor.

For Faster Anneal — In most plants, where continuous furnaces are used, the silicon content of the castings is maintained at 1.35 per cent, or higher. This helps graphitization in both stages of the anneal. Generally, the metal also contains some boron, which also helps the malleableizing process. Owing to the small tonnage in each zone and the favorable composition, shorter cycles are possible.

Typical cycle: 6½ hours to 1750°F; 7 hours at 1750°F; 1½ hours cooling to 1400°F; 7 hours 1400 to 1310°F. Total time is 22 hours.

Other continuous, radiant-tube ovens are operated on cycles of between 25 and 35 hours. Fuel consumption on the largest installations is 2800 cu ft of 1000 Btu gas per ton of castings. The protective atmosphere may be provided by a combustible gas or by a high - nitrogen - content, noncombustible gas which acts as a diluent.

Efficient—Electric, roller-hearth continuous furnaces are popular, where used, due to the high ratio of castings per container (about 4 lb of castings per pound of tray or container compared with 1½-lb per pound in the case of some other equipment). A small amount of gas is used for the atmosphere. Tonnages range up to 50 tons per 24-hour day.

With a favorable metal composition, the remarkably short cycle of 19 hours is used at one plant. Here it is: 1½ hours to 1775°F; 7½ hours at 1775°F; 1½ hours to 1450°F; 8 hours to 1340°F; ½-hour to discharge. Air blown through tubes accelerates cooling in required locations. Power consumption is 285 kw-hr per ton.

Continuous, car-type furnaces, with castings packed in pots, are used some. These are gas-fired with various temperature zones through which the cars pass. A cycle used in one plant: 10 hours to 1750°F; 15 hours at 1750°F; 5 hours to 1700°F; 8 hours to 1400°F; 13 hours to 1320°F; 3 hours to 1275°F; 2 hours to 1240°F. Total time is 57 hours.

• *Extra copies of this article and the article on pearlitic malleable (to appear next week) are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

18 Smooth, Uniform Braze Welds in 8 minutes Add Economy to Quality in Peabody Classroom Chairs

Braze welded frame of PTAR Tablet Armchair

Braze welded frames for Peabody school furniture—combination of chair and open-front table.

Anaconda-997 Low-Fuming Bronze Rods Make Well-Shaped Braze Welds, Essential for Eye Appeal and Extra Strength, Says Leading School Furniture Manufacturer—and Lower Production Costs too.

The Peabody Seating Company, Inc., North Manchester, Ind., has been making quality school furniture since 1902. Well-shaped braze welds, they say, are essential to maintain this quality. And they have found that Anaconda-997 Low-Fuming Bronze Rods make this kind of joint, not only adding eye appeal but providing the extra strength needed in school furniture.

By depositing smooth-flowing and low-fuming weld metal, these rods promote faster, more uniform work and thereby reduce production costs. The 18 braze welds pictured are made in 8 minutes—an average of about ½ minute per joint.

Anaconda-997 Low-Fuming Bronze is a superior welding rod used to join gray and malleable cast iron, steel and copper alloys by the oxyacetylene process. It is also used for repair welding, and to deposit bearing surfaces on steel and iron. You can get other Anaconda Copper Alloy Welding Rods for many different production and repair purposes. They are sold by distributors of welding equipment everywhere. Anaconda distributors are also a good source of practical advice on welding problems. Purity Cylinder Gases, Grand Rapids, Mich., and Warsaw, Ind., furnish Peabody with Anaconda-997 Rods. For additional information write for Publication B-13. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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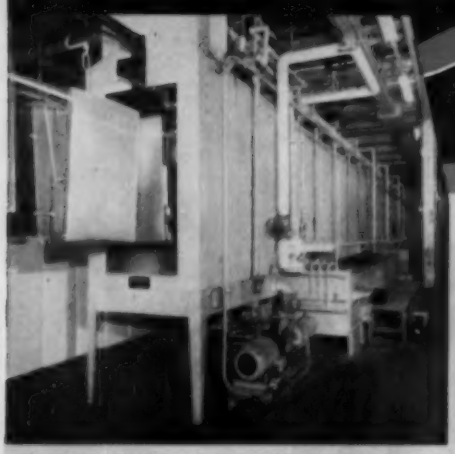
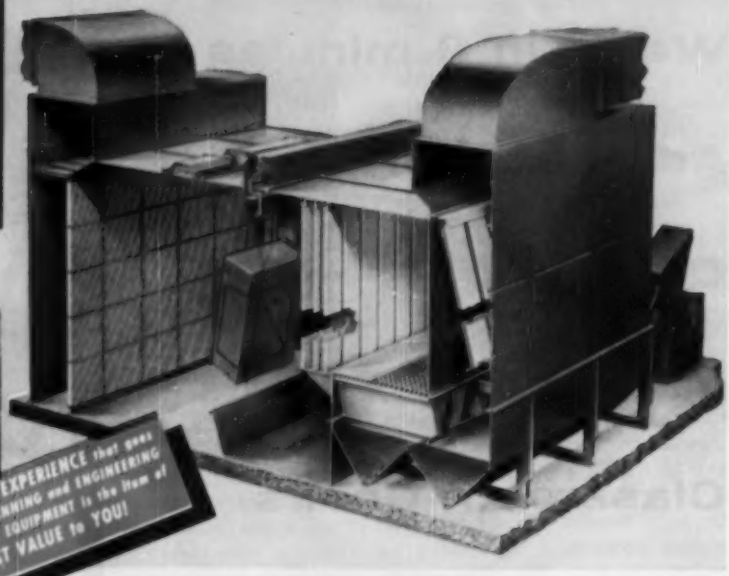


One of Two Mahon Seven-Stage Metal Cleaning and Rust Proofing Machines designed for processing Refrigerator Parts and installed in the plant of one of the world's largest manufacturers of Home Appliances.



One of Four Mahon TYPE 54 AC-F PUMPLESS Hydro-Filter Spray Booths installed in the Porcelain Enamel Finishing Line of the same manufacturer referred to above. Note tubular sludge unloading conveyor casing at bottom of sludge tank.

Mahon Double-Deck Overhead Frit Drying Oven in the Porcelain Enamel Finishing Line of the same manufacturer referred to above. Other Mahon equipment in this finishing operation includes Dry-Off Ovens, Cooling Tunnels, Brushing Booths, Touch-Up Booths, Filtered Air Supply System and other Special Items.

PUMPLESS Hydro-Filter SPRAY BOOTH is Highly Successful in FRIT SPRAYING OPERATIONS!

Mahon Type 54 AC-F Hydro-Filter Spray Booth, designed especially for Frit Spraying in porcelain enameling operations, is a departure from the conventional water-wash spray booth. There are no recirculating pumps. The normal exhaust fan, used to ventilate the spray booth, provides the washing action through air accelerators which impinge the airborne frit particles into the surface of the water in the sludge tank. Dry baffle plates are provided in front of the Hydro-Filter chamber for maximum recovery of Frit. The bottom of the sludge tank is in the form of two "V" shaped hoppers with the continuous conveyor of the automatic sludge unloader at the bottom. In the development of Type 54 AC-F, Mahon engineers have not only produced a highly effective Frit Booth, but, through elimination of high pressure pumps and the addition of the automatic sludge unloader, have reduced operating cost and maintenance to an absolute minimum. If you have a finishing problem, or are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified, also, to do the all-important planning and engineering of equipment—which is the key to fine finishes at minimum cost. No matter what you paint, or by what process, Mahon equipment will serve you better . . . because its engineered better and built better for more economical operation over a longer period of time. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656.

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Scrap Metal Baler Makes Briquettes in 3 Minutes

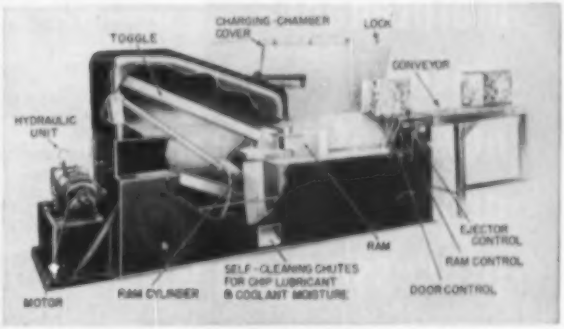
Only one unskilled worker is needed to operate this baler; it has only three controls.

The 9-cu-ft charging compartment will take up to 54-in. lengths of 24-gage light metal or 16-gage steel wire. Scrap metal and trimmings are compressed hydraulically into uniform briquettes 12 x 12 x 12 in. for easy handling and transportation.

Tin or steel briquettes will weigh about 100 lb; 16-gage steel wire, 105 lb; brass or copper, 80 lb; aluminum, 40 lb.

Safety features automatically protect the operator from danger and the machine from damage. There is a hydraulically operated, self-locking door control for the charging compartment. A special by-pass valve stops the ram cycle if material of too heavy a gage is put in the charging compartment.

The baler occupies 49 sq ft. It can be installed at



the source of scrap and trimmings to speed baling and cut the cost of moving scrap. It needs no pit or anchoring. *Write*: Balemaster Division, East Chicago Machine Tool Corp., East Chicago, Ind. *Phone*: 7470

Steam Gun Protects Operator from Heat

Where other steam cleaning devices use separate tubes for solution and heat, this gun has a tube within a tube.

Steam passes through the insulated interior tube, the solution through the outside. The steam loses none of its heat, but the cleaning solution reduces the external temperature of the gun.

The solution is drawn automatically into the nozzle of the gun by the partial vacuum created by the steam passing through.

A sealed rotary joint makes it possible to rotate the nozzle without twisting or wrestling with a heavy solution or steam hose.

While the forward end of the gun revolves to clean at any desired angle, the handle and hose connections remain stationary. Operator fatigue is further reduced by designing the gun so the thrust of the steam is taken up between the handles.

The precision-made gun has a cast aluminum, spade-type rear handle, cast brass valves, stainless steel tubes and nozzle and an oil-resistant rubber grip.

The 3½-ft gun weighs 6¾-lb; the 5-ft model slightly more.

The only moving parts are the brass valves and the sealed rotary joint—maintenance is simple. There is little danger of clogging or scaling because the solution goes through the tube at a comparatively low temperature. A stainless steel tip protects the nozzle.

All that is needed to operate the gun are steam and solution hoses, cleaning solution and 30 lb of steam. You can rinse by shutting off the solution

valve and using steam alone.

The gun is for cleaning large parts and intricate machinery; floors, walls and loading docks; truck and bus chassis; and paint stripping. *Write*: Oakite Products Inc., 34E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

NEW PRODUCTS and equipment

Optical Comparator

High intensity parallel light is given through special condensers and a new lamp house.

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A precision-ground steel stage affords an ample work area for accurate mounting of parts or special holding fixtures. The image screen is 14 in. in diameter.

Magnifications range from 10 to 100 power. *Write*: Portman Instrument Co. Inc., New Rochelle, N. Y. *Phone*: New Rochelle 2-3556

Roof Ventilator

This reversible ventilator moves air in either direction with almost equal efficiency.

Under normal exhaust conditions, the unit operates like any other roof ventilator. Throw a

NEW PRODUCTS and equipment

switch, and it becomes an intake unit.

It is made in 28, 36 and 44 in. sizes. Exhaust capacity ranges from 5500 to 23,600 cfm. The unit comes in all sizes for flat roof, slope roof and peak installation. *Write*: Hartzell Propeller Fan Co., Piqua, O. *Phone*: 850

Coreblower

This pushbutton coreblower brings mechanization to small plants.

All operations are automatic. All types of coreboxes can be handled —open face, horizontally split and vertically split. *Write*: Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 N. Cicero Ave., Chicago 39, Ill. *Phone*: Berkshire 7-3700

Vacuum Cleaner

This industrial cleaner operates on compressed air. When connected to an air line, it develops more

NEW PRODUCTS and equipment

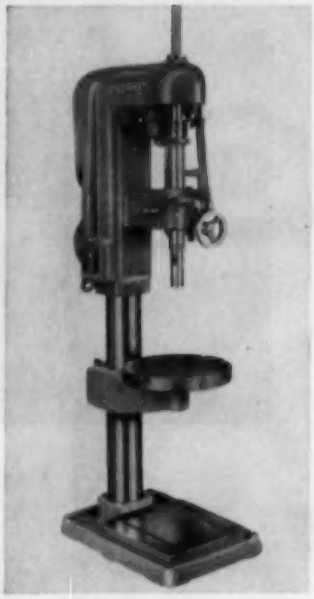
than twice the suction of a standard, 1-hp electric unit of equivalent size.

The cleaner uses 25 cu ft of free air a minute. It is mounted on free-moving rubber wheels. Its capacity is 20 gallons. *Write*: American Balmes Corp., 859 Summer Ave., Newark 4, N. J.

Floor Drill

This 21-in. stationary head drill has a power feed for easier drilling and higher production. A selector gives any of four rates of feed. Power feed is disengaged automatically by a depth gage.

There are eight spindle speeds, from 23 to 400 rpm.



The drills are shipped with motor and controls and are ready to operate as soon as power leads are connected to the factory-installed electrical controls built into the head.

Drill rating is 1½-in. in cast iron with a 1-hp, 1800-rpm motor. *Write*: Cincinnati Lathe & Tool Co., Cincinnati 9, O. *Phone*: Redwood 2121

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An electric, double-end machine can deburr or chamfer both ends of a tube or pipe at the same time. Tubing from ⅜ to 1¾-in. in diameter and 3 to 72 in. long can be processed at rates over 4500 pieces an hour.

Radial stability is more than 10,000 lb. Changing sizes takes only a few minutes.

Two, ¾-hp, variable-speed drives power the spindles; the main drive is powered by a 1½-hp, variable-speed drive. *Write*: Tubco Industries Inc., 14211 Manhattan, Oak Park, Mich.

Aluminum Welding Cable

This welding cable is light and flexible; it reduces operator fatigue.

The combined insulation and jacket of tough vulcanized rubber resists abrasion, impact, flexing and twisting. It will not kink. *Write*: General Cable Corp., 420 Lexington Ave., New York 17, N.Y. *Phone*: Lexington 2-2920

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Steel bar stock (rounds 1 in. in diameter or an equivalent area) is cut by this 5-hp cutoff machine.

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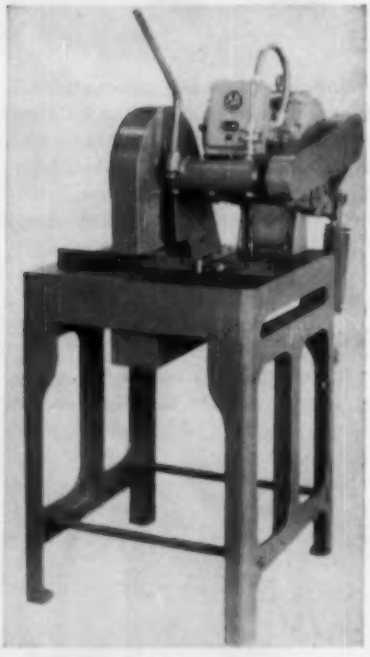

for proper drive-belt tension. An adjustable spring counterbalance makes wheel "chopping" easier. *Write*: Tabor Mfg. Co., division of Turbo Machine Co., Lansdale, Pa.

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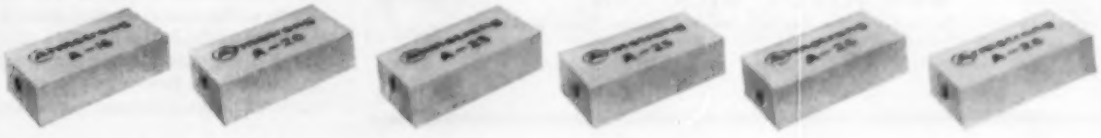

NEW literature

Write directly to the company for a copy

Belt Conveyor Carriers

Standard and special belt conveyor carriers and trippers are described—bulletin 355, 16 pages. Stephens-Adamson Co., Aurora, Ill.

Wire Rope Slings

Various assemblies for which slings can be used are illustrated; dimensions and capacities are listed. Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., 575 Madison Ave., New York, N. Y.

Boring Machines

Cam-operated machines for precision boring, contouring, turning, facing and grooving are described—bulletin 31751, 4 pages. Ex-Cell-O Corp., Detroit 32, Mich.

Stainless Fasteners

A 52-page data book gives illustrations and specifications of 40 basic fastening devices and engineering data on stainless steel. Allmetal Screw Products Co. Inc., 821 Stewart Ave., Garden City, Long Island, N. Y.

Heating and Cooling Coils

Test procedures for steam and hot water heating coils and chilled water and volatile refrigerant cooling coils are included in a new code—bulletin 202, 20 pages. Heating & Cooling Coil Manufacturers' Association, 2159 Guardian Bldg., Detroit 26, Mich.

Wax Injection

Here are 8 pages devoted to wax injection presses for investment casting. Alexander Saunders & Co., 95 Bedford St., New York 14, N. Y.

Building Standardization

Steel structures for industry are described in a 28-page, illustrated catalog. Luria Engineering Co., Bethlehem, Pa.

Vibrating Screens

Form 652, 20 pages, describes screens for handling heavy materials, such as sand, ore, coal and limestone. Pioneer Engineering Works Inc., 1515 Central Ave., Minneapolis, Minn.

Hard-Surfacing Alloys

Described are alloy-filled tubes. They are in coils for automatic welding, cut to length for manual use—6 pages. Coast Metals Inc., Little Ferry, N. J.

Wrought Aluminum

Here's an 8-page bulletin describing extruded shapes, structurals, machining stock, drawn tube, forging stock, press forgings, impact extrusions, screw machine products and heavy press extrusions. Harvey Aluminum Division, Harvey Machine Co. Inc., 19200 S. Western Ave., Torrance, Calif.

Canmaking

A complete line of double seaming machines for medium and high speed canmaking lines are covered—catalog 36B section 5, 12 pages. E. W. Bliss Co., 50 Church St., New York 7, N. Y.

Cylinder Head Machining

Here's the story of how a production line layout is combined with automatic mass machining methods to cut costs—8 pages. Dept. P-TM, W. F. & John Barnes Co., 301 S. Water St., Rockford, Ill.

Steels

Performance of electrical steel sheets and coiled electrical steel strip is presented—bulletin EM 21, 28 pages. Data sheets cover a new series of materials—hot-work steels, air-hardening, high-carbon, high-chrome

NEW LITERATURE

tool steels, oil or flame hardening die steel and low alloy tool steels. Sales Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Powder Metallurgy

A summary of the process, typical applications and design facts are presented—18 pages. Keystone Carbon Co., St. Marys, Pa.

Containers

Here's how difficult shapes are packed in wirebound boxes—12 pages. General Box Co., 1825 Miner St., Des Plaines, Ill.

Variable Speed Transmission

A wide-range unit developing a big ratio of maximum-to-minimum output speeds is described—4 pages. Lombard Governor Corp., Ashland, Mass.

Engine Line Automation

The processing of V-8 automobile blocks is illustrated—12 pages. Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.

Thermocouples

Standard conversion tables give temperature-millivolt equivalents—16 pages. Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill.

Production Stamping

Presses for high-speed stamping with progressive dies are depicted in the 24-page catalog H. Danly Machine Specialties Inc., 4358 W. Roosevelt Rd., Chicago 50, Ill.

Cutting Speeds

Surface speeds and tool angles for machining aluminum stock in automatic screw machines are given on a wall chart. Industrial Service Division PR 155, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

Aluminum Bronzes

A 32-page booklet, 15.100-1, tells the properties, composition and uses of aluminum bronze alloys in sand, centrifugal, investment and permanent mold castings, hammer forgings and heat treated and machined parts. W W Alloys Inc., division of Fansteel Metallurgical Corp., 11724 Cloverdale Ave., Detroit 4, Mich.

NEW BOOKS

Canadian Trade Index 1955, Canadian Manufacturers' Association Inc., 67 Yonge St., Toronto 1, Canada. 1119 pages, $7.50.
Over 10,000 manufacturing firms are listed alphabetically and by product.

Helical Spring Tables, John D. Gayer and Paul H. Stone Jr., Industrial Press, 93 Worth St., New York 13, N. Y. 165 pages, $5.
Spring selection can be made with minimum calculation from this index of ready-designed compression and tension springs.

Aluminum Paint and Powder, third edition, Junius D. Edwards and Robert I. Wray, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. 219 pages, $4.50.
Manufacture, properties and testing of aluminum powder are fully described. Full chapters discuss the composition, properties and uses of aluminum paint in a wide variety of industrial applications.

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STEEL
December 19, 1955

Market Outlook

UPWARD PRESSURE on steel prices is near a bursting point. Already there have been some leaks in the form of scattered increases, mostly in price extras.

Steelmaking costs keep going up and up. One small, busy steel producer, hard hit by rising costs, describes its predicament as profitless prosperity.

UPWARD HO— Scrap, a big raw material factor in steelmaking, continues to set new highs pricewise. In the week ended Dec. 14, STEEL's price composite on steelmaking scrap was at an unprecedented $50.17 a gross ton, a $1.34 rise over the preceding week. A month ago, the composite was considered high, but then it was only $45.67. A year ago it was $32.42.

FERROALLOYS RISE—Other steelmaking materials headed up are ferroalloys. New prices will become effective Jan. 1 for contract users and immediately for spot buyers. Increases average 3.6 per cent on managanese alloys to 7.6 per cent on silicon alloys. Standard ferromanganese, for instance, goes up three-quarters of a cent a pound, or 7.9 per cent. The increases are attributed to rising costs, particularly for ore and scrap.

Also up is Brazilian iron ore. Spot price for 68-69 per cent iron content material rose 8 per cent.

AUTO RACE—Adding to the upward push on prices is demand. There's no let-up in orders for steel. The automobile industry expects its first-quarter production to push 16.6 per cent over the 1955 fourth quarter and 10 per cent over the 1955 first quarter. Projected are 2,338,350 passenger cars—tops for any quarter.

The construction industry, second only to the automobile industry in steel consumption, isn't getting all the steel it needs. Shortages of plain material are forcing delays on a number of structural projects that are under way and is causing builders to move cautiously in committing themselves on new work.

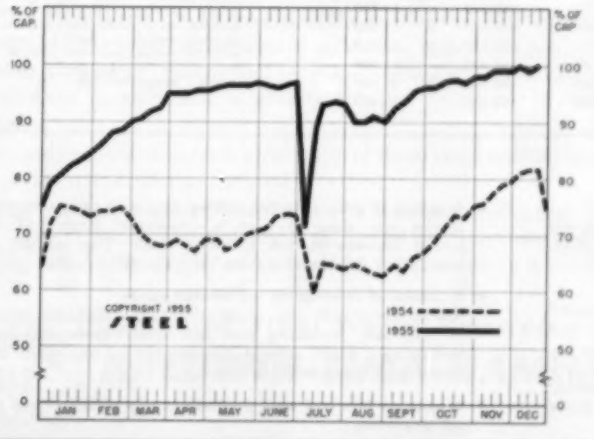
GETTING A SHARE—Also forced to suspend for lack of steel is a northern New Jersey railroad carbuilding shop. Railroads were latecomers in the steel market, but their orders will be worked into rolling schedules as soon as possible. The carriers will get more steel in the first quarter than they got in the fourth quarter of 1955, and their allotments for the second quarter will continue to rise.

FULL SPEED—In trying to supply demand, the steel industry produced steel for ingots and castings at 100 per cent of capacity in the week ended Dec. 18. That's an increase of 1 point over the preceding week.

In the week ended Dec. 18, the old record for annual steel production was broken. Every day the rest of this year will build the new record higher. By this morning, 112,695,000 net tons had been produced this year. Most ever made in a year was 111,609,719 tons in 1953.

MORE CAPACITY—Helping the industry operate at 100 per cent of capacity is the rise in capacity. Production rates are calculated on capacity as of Jan. 1, 1955. Capacity has risen around 2 million tons since then. That's the increase Joseph L. Block, president, Inland Steel Co., believes has taken place.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 18	Change	Same Week 1954	Same Week 1953
Pittsburgh	102	+ 0.5*	78.5	90
Chicago	98.5	— 0.5	87.5	94
Mid-Atlantic	99	0	75	85
Youngstown	100	0	87	82
Wheeling	103	+ 3	86	91
Cleveland	98.5	0	95.5	80.5
Buffalo	105	0	100	88
Birmingham	94.5	0	67	70
New England	89	0	70	75
Cincinnati	92.5	+ 1	71.5	73
St. Louis	107.5	+ 4	79	88
Detroit	100.5	+ 1.5	75.5	98
Western	107	+ 4	87	88
National Rate	100	+ 1	81.5	83.5

INGOT PRODUCTION‡

	Week Ended Dec. 18	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	149.2†	150.4	149.0	121.4
NET TONS (In thousands)	2,397†	2,416	2,394	1,950

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 41 Technical Outlook—p. 87

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 12 1955	Dec. 6 1955	Month Ago	Nov. Average
(1947-1949=100)	154.8	154.6	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.183
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	5.143
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.406
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.491
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	20.134
Structural Shapes	4.867	Pipe, Line (100 ft)	161.592
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.550	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H. R., Stainless, 303 (lb)	0.460	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	5.660	Wire, Drawn, Carbon	5.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.090	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 14 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	167.67
Index in cents per lb	5.659	5.659	5.659	5.270	4.545

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$103.50
No. 2 Fdry. Pig Iron, GT	58.99	58.99	58.99	56.54	52.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	52.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	53.27
Steelmaking Scrap, GT	50.17	48.83	45.67	32.42	45.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 14 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	4.18
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	4.84	4.84	4.84	4.53	3.90
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Contesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.59-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.25
Strip, C.R., Chicago	6.35	6.35	6.35	5.85	4.50-4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.80
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50

SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, 7/32-9/16" Pitts.	5.025	5.025	5.025	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$53.00
Basic, Valley	58.50	58.50	58.50	56.00	52.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	56.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	52.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	55.16	56.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.58
Malleable, Valley	59.00	59.00	59.00	56.50	52.50
Malleable, Chicago	59.00	59.00	59.00	56.50	52.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$50.00	$47.50	$45.50	$32.50	$46.50
No. 1 Heavy Melt, E. Pa.	50.00	50.00	47.00	31.75	45.00
No. 1 Heavy Melt, Chicago	50.50	49.00	44.50	33.00	45.00
No. 1 Heavy Melt, Valley	52.50	52.50	48.00	34.50	46.25
No. 1 Heavy Melt, Cleve.	50.50	49.50	45.50	32.50	45.75
No. 1 Heavy Melt, Buffalo	45.50	45.50	43.50	30.50	49.88
Rails, Rerolling, Chicago	73.50	73.50	66.50	52.50	67.00
No. 1 Cast, Chicago	50.50	49.50	47.50	39.50	63.00

COKE, Net Ton					
Beehive, Furn, Connisvl.	$13.625	$13.625	$13.625	$13.75	$14.75
Beehive, Fdry, Connisvl.	16.50	16.50	16.50	16.75	16.75
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

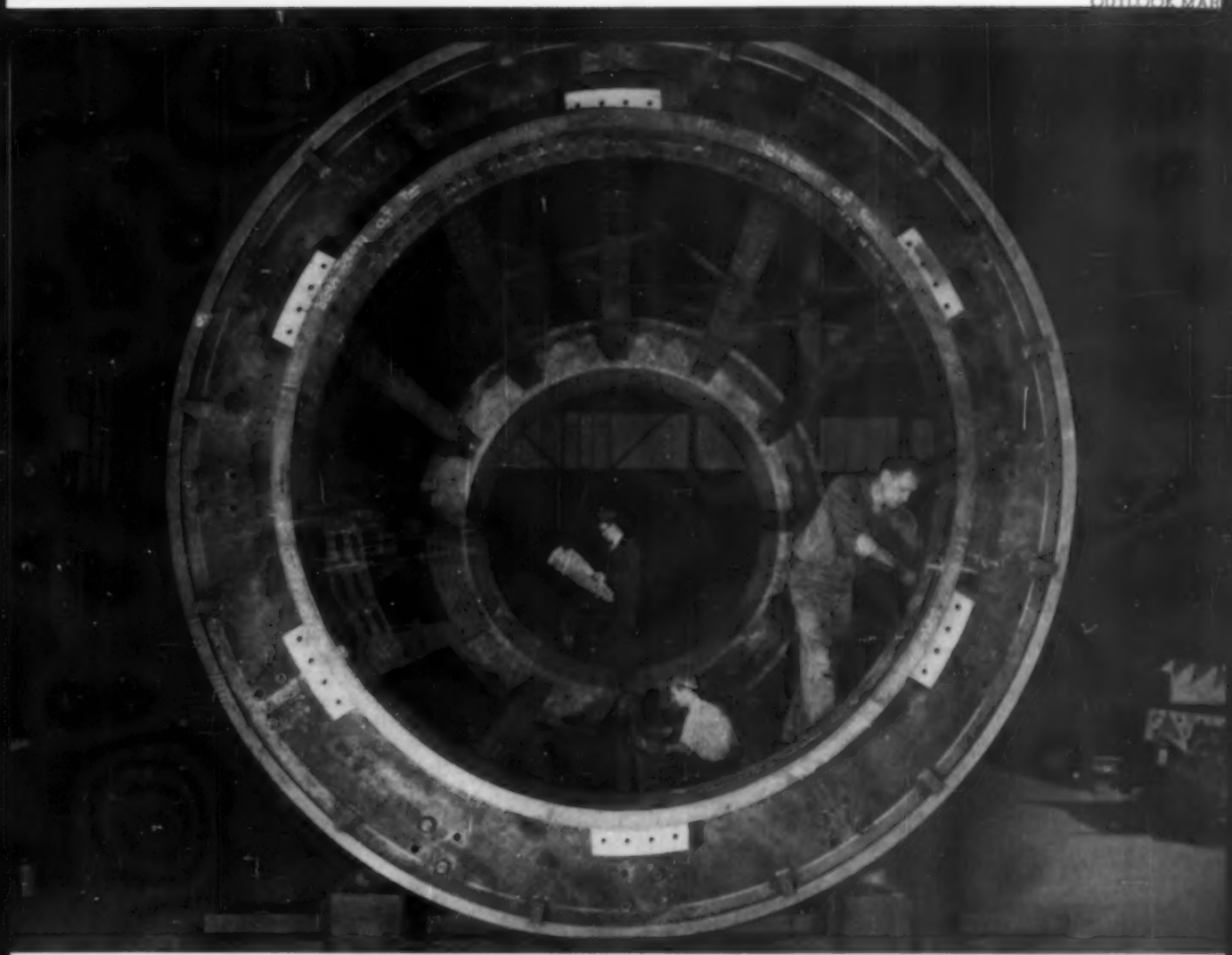
Daily Nonferrous Price Record

	Price Dec. 14	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1954 Avg.
Copper	43.00-49.00	Dec. 13, 1955	43.00-48.00	44.420	44.594	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	15.300	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.000	13.020	11.500
Tin	110.00	Dec. 13, 1955	109.00	97.825	96.230	88.649
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



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SSW forged rings consistently have proven to Heyl & Patterson, Inc., Pittsburgh, they can take the rugged, heavy wear of their coal breakers. They've found Standard Steel's inherent uniform structure and high-quality analysis makes for longer-lasting, failure-proof life of these rings.

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Nonferrous Metals

Labor harmony and high-level demand help bring zinc and lead a banner year. Copper and nickel still try to catch up with demand

Nonferrous Metal Prices, Pages 126 & 127

DOMESTIC ZINC consumption will set a record in '55. Domestic shipments, reports the American Zinc Institute, reached 906,843 tons during the first 11 months of this year.

Consumption in December will push the statistical table over the 1-million-ton mark for the first time.

Other significant figures: November stocks dropped to 38,021 tons from the October level of 43,868 tons. And unfilled orders at the end of November jumped from an October level of 61,746 tons to 64,560 tons.

Lead—Producers are elated over the current demand for lead, which is unusually high for this time of year, and (most producers indicate) promises to continue. By the first of the year, lead salesmen generally have little to do for several weeks. Point of interest: Scrap battery lead is tight at a few places in the U. S.

While most industry spokesmen feel that lead and zinc are about in proper relationship from a price standpoint, it is possible that the price of either could rise. It will depend largely on the London market.

Copper—No copper will go into stockpile during the first quarter of '56. Some 14,000 tons will be deferred.

Meanwhile, there are indications that copper demand is going to level off in 1956. This continues to be a persistent thought in the minds of those close to the picture.

Reasons—World copper production for the first ten months of this year reached 2,237,997 tons. By adding 500,000 tons for the remainder of this year, some 2,737,997 tons will be produced. Next year's total, say the experts, will be over 3 million.

For the last two years, most consumers have taken a forward view of the market at the beginning of each year. Most decided at the beginning of 1954 and 1955 that the price of copper would drop during the year. Then gambling on this decision, users allowed stocks to drop to low and even inefficient levels during the year. As LIFO time approached, each user was forced to buy large quantities of the red metal —at a higher rather than lower price. Users will not do this in '56. There is every indication that the price will remain at 43 cents a pound for primary and about 49 cents a pound for custom-smelted copper through the first half of '56.

Outlook: More mining facilities are coming in. Users will take a more realistic attitude toward buying. The government will continue to divert the red metal. And if these elements are combined with labor tranquility during the coming year, the copper shortage could come to an end.

Meanwhile, the Chilean copper situation blew sky high as miners, who had threatened to go out on strike earlier in the month, walked out on Dec. 14. The strike threat sent prices soaring on the London Metal Exchange (Dec. 13) as buyers bid the equivalent of 51.125 cents a pound for spot. Custom smelted copper in the domestic market rose to 49 cents a pound.

Tin—The tin shortage is temporary. For several weeks, supply has been exactly equal to demand. Now demand has taken a sudden jump. Result: Tin prices soared to about 110 cents a pound last week.

Some of the factors involved: 1. Many of the traders paying premium prices are professionals who sold short earlier in the year and must enter the market now to cover. Price is a minor consideration to them. 2. Indonesian tin production is down. 3. Political tensions are mounting in the tin-producing areas of the world.

Another important factor for the rest of this month is that the Singapore tin smelter was shut down Dec. 10 for stocktaking, which involves closing down the entire facility for furnace repair, tin reclamation, inventory, etc., until the first of the year. Experts on this side of the ocean are baffled by this move.

Nickel—The government has deferred 12.3 million lb of nickel slated for stockpile during the first quarter of '56.

A portion of the total will be premium priced ferronickel and nickel ingot. Question of the week: How much of this nickel will find its way to the civilian market as military needs continue to increase?

As the nickel shortage continues, more attention is being focused on the U. S.'s Nicaro, Cuba, nickel mine. Its current production is 30 to 31 million lb (annually) of contained nickel, plus cobalt in nickel oxide in powder and sinter form.

The outstanding feature of Nicaro powder and sinter is that it is 88 to 90 per cent nickel, plus cobalt—with no trace of copper.

The following could happen in '56 at Nicaro: 1. Refining and smelting facilities might be put in which would introduce metallic nickel production to Nicaro. 2. Cobalt separation facilities could be built. This would allow cobalt metal to be sold and, in turn, would reduce the amount of sintered and powdered cobalt.

With the current nickel shortage, the chances are good that this will all come about next year. In addition, Cuba is most anxious to keep some 1500 employees busy. It does not want to see its mine shut down as it was after World War II.

By putting in smelting and refining facilities, the U. S. would interest many more buyers for its Nicaro project. There are numerous problems which would have to be ironed out before an American company could buy Nicaro.

Example: At this time, the operating materials, such as coal, oil, ammonia, etc., are sent to Cuba duty free. Interested companies would want to be granted the same privilege.

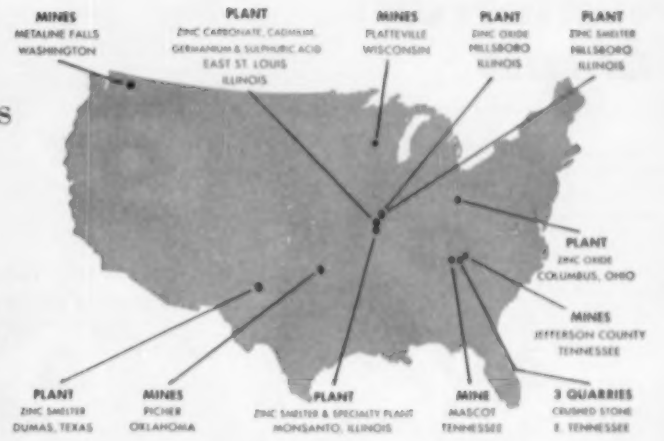
Domestic Zinc Deliveries Head for 1-Million-Ton Year

(in tons)

		Shipments				
	Production	Domestic	Export & Drawback	U. S. Stockpile	Total	Stocks (end of month)
Nov.	86,813	90,819	280	1,561	92,660	38,021
Oct.	89,449	85,770	36	1,942	87,748	43,868
Sept.	83,448	83,664	1,274	2,427	87,365	42,167

Source: American Zinc Institute

American Zinc and its products *from* A *to* Z



CONCENTRATING MILL, MASCOT, TENNESSEE

One of the key factors in American Zinc's widespread mining and milling operations. In Tennessee, American Zinc also owns and operates mines in Jefferson County. It is here that one of the largest known reserves of zinc in the United States is found (in excess of 1,250,000 tons of recoverable zinc, proven, with additional large reserves indicated). Other company-owned and operated mining properties are located at Platteville District, Southern Wisconsin; Metaline Falls District, Eastern Washington; and Picher field of the Tri-State Area (Missouri-Kansas-Oklahoma). For the complete picture, see map above.

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CRUSHED STONE

Distributors for

American Zinc sales Company

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 49.00 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis. 100 lb lots.

Magnesium: 99.8% self-pelletizing pig, 32.50; notched ingot, 32.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.35 per lb; pressed ingot, $4.00 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom, per troy oz.

Palladium: $22-24 per troy oz.

Platinum: $97-$117 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $115-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 90.16 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.79 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, $1.10.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45, grade A-2 (0.8% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.80 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced $5.00. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.75, deld. Diecasting alloy ingot No. 3, 17.59; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 32.50-34.50; No. 12 foundry alloy (No. 2 grade) 31.50-31.75; 5% silicon alloy, 0.60 Cu max, 33.00-33.75; 13 alloy, 0.60 Cu max, 33.00-33.75; 195 alloy, 33.00-33.75; 108 alloy, 31.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.50-32.50; grade 2, 30.50-31.50; grade 3, 29.50-30.50; grade 4, 28.50-29.99.

Brass Ingot: Red brass No. 115, 42.00; tin bronze No. 225, 56.00; No. 245, 48.75; high-leaded tin bronze No. 305, 45.75; No. 1 yellow No. 405, 33.25; manganese bronze No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l. 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.60; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H. R. strip, $19; C. R. trip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	62.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.6	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*45 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅛	$16.55	2	$ 51.95
1	26.50	4	143.00
1¼	35.55	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lb or more, 0.250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c. Angles, 1 x 1 x ⅛-in., 68.40c; 2 x 2 x ⅛-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 20.00-20.50; old sheets 17.00-17.50; borings and turnings, 11.50-12.00; crankcases, 17.00-17.50; industrial castings 17.00-17.50.

Copper and Brass: No. 1 heavy copper and wire 40.00-40.50; No. 2 heavy copper and wire, 37.50-38.00; light copper, 35.00-35.50; No. 1 composition red brass, 31.00-31.50; No. 1 composition turnings, 30.00-30.50; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	63.13b	60.38c	....	63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	26.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.500	32.000
Naval Brass	53.63	49.94	62.60	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.60	66.33g	66.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.875	37.625	37.875
Manganese Bronze	59.37	53.38	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 17.00-17.50; new brass clippings, 27.00-27.50; light brass, 18.00-18.50; heavy yellow brass, 21.00-21.50; new brass rod ends, 25.50-26.00; auto radiators, unsweated, 24.00-24.50; cocks and faucets, 24.00-24.50; brass pipe, 25.00-25.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-65.00; old sheets, 50.00-65.00; turnings, 44.00; rods, 54.50-65.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.50-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 23.50-24.00; 3003 clippings, 23.75-24.00; 61.51 clippings, 23.50-24.00; 5052 clippings, 23.50-24.00; 2014 clippings, 23.00-23.50; 2017 clippings, 23.00-23.50; 2024 clippings, 23.00-23.50; mixed clippings, 23.00-23.50; old sheet, 19.50-21.00; old cast, 20.50-21.00; clean old cable (free of steel), 24.00; borings and turnings, 21.00-22.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 40.00; light copper, 37.75; refinery brass (60% copper) per dry copper content, 38.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 41.50; No. 2 heavy copper and wire, 40.00; light copper, 37.75; No. 1 composition borings, 33.50; No. 1 composition solids, 34.50; heavy yellow brass solids, 23.50; yellow brass turnings, 22.50; radiators, 27.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.79, oval, 56.92, 5000-10,000 lb; electrodeposited, 54.28, 2000-5000 lb lots; cast 59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 2 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.225; 200-499 lb, $1.21; 500-999 lb, $1.205; 1000 lb or more, $1.20.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 160-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 200 lb, 75.40; 100-499 lb, 60.90; 700-1900 lb, 58.30; 2000-9900 lb, 56.70; 10,000 lb or more, 55.50.

Stannous Chloride (anhydrous): Less than 50 lb, $1.673; 50 lb, $1.333; 100-300 lb, $1.183; 400-900 lb, $1.159; 1000-1900, $1.135; 2000-4900 lb, $1.098; 5000-19,900 lb, $1.037; 20,000 lb or more, 97.50.

Stannous Sulphate: Less than 50 lb, $1.368; 50 lb, $1.066; 100-1900 lb, $1.048; 2000 lb or more, $1.028.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 129. Key to footnotes, Page 131.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$65.50

INGOTS, Alloy (NT)

Detroit R7	69.00
Houston 85	74.00
Midland,Pa. C18	69.00
Munhall,Pa. U5	69.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$68.50
Bessemer,Pa. U5	68.50
Bridgeport,Conn. N19	73.50
Buffalo R3	68.50
Clairton,Pa. U5	68.50
Ensley,Ala. T2	68.50
Fairfield,Ala. T2	68.50
Fontana,Calif. K1	76.00
Gary,Ind. U5	68.50
Johnstown,Pa. B2	68.50
Lackawanna,N.Y. B2	68.50
LoneStar,Tex. L6	74.50
Munhall,Pa. U5	68.50
Pittsburgh J5	68.50
S.Chicago,Ill R2 U5	68.50
S.Duquesne,Pa. U5	68.50
Youngstown R2	68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5	$84.50
Bessemer,Pa. U5	84.50
Bridgeport,Conn. N19	89.50
Buffalo R2	84.50
Canton,O. R2	86.50
Clairton,Pa. U5	84.50
Conshohocken,Pa. A3	89.50
Ensley,Ala. T2	84.50
Fairfield,Ala. T2	84.50
Fontana,Calif. K1	92.00
Gary,Ind. U5	84.50
Geneva,Utah C11	84.50
Houston 85	89.50
Johnstown,Pa. B2	84.50
Lackawanna,N.Y. B2	84.50
LosAngeles B3	94.00
Midland,Pa. C18	84.50
Munhall,Pa. U5	84.50
Pittsburgh J5	84.50
Seattle B3	98.00
S.Chicago R2,U5,W14	84.50
S.Duquesne,Pa. U5	84.50
S.SanFrancisco B3	94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$96.00
Buffalo R2	96.00
Canton,O. R2, T7	96.00
Conshohocken,Pa. A3	103.00
Detroit R7	96.00
Fontana,Calif. K1	115.00
Gary,Ind. U5	96.00
Houston 85	101.00
Ind.Harbor,Ind. Y1	96.00
Johnstown,Pa. B2	96.00
Lackawanna,N.Y. B2	96.00
LosAngeles B3	116.00
Massillon,O. R2	96.00
Midland,Pa. C18	96.00
Munhall,Pa. U5	96.00
S.Chicago R2,U5,W14	96.00
S.Duquesne,Pa. U5	96.00
Struthers,O. Y1	96.00
Warren,O. C17	96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$103.50
Canton,O. R2	103.50
Cleveland R3	103.50
Gary,Ind. U5	103.50
S.Chicago R2,W14	103.50
S.Duquesne,Pa. U5	103.50

SKELP

Aliquippa,Pa. J5	4.325
LoneStar,Tex. L6	4.625
Munhall,Pa. U5	4.225
SparrowsPoint,Md. B2	4.225
Warren,O. R2	4.225
YoungstownR2, U5	4.225

WIRE RODS

AlabamaCity,Ala. R2	5.025
Aliquippa,Pa. J5	5.025
Alton,Ill L1	5.20
Buffalo B11, W12	5.025
Cleveland A7	5.025
Donora,Pa. A7	5.025
Fairfield,Ala. T2	5.025
Houston 85	5.275
IndianaHarbor,Ind. Y1	5.025
Johnstown,Pa. B2	5.025
Joliet,Ill. A7	5.025
KansasCity,Mo. S6	5.275
Kokomo,Ind. C16	5.125
LosAngeles B3	5.825
Minnequa,Colo. C10	5.275
Monessen,Pa. P7	5.025
N.Tonawanda,N.Y. B11	5.025
Pittsburg,Calif. C11	5.675
Portsmouth,O. P12	5.025
Roebling,N.J. R5	5.125
S.Chicago,Ill R2	5.025
SparrowsPoint,Md. B2	5.125
Sterling,Ill.(1) N15	5.025
Sterling,Ill. N15	5.125
Struthers,O. Y1	5.025
Worcester,Mass. A7	5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	4.60
Aliquippa,Pa. J5	4.60
Bessemer,Ala. T2	4.60
Bethlehem,Pa. B2	4.65
Birmingham C15	5.10
Clairton,Pa. U5	4.60
Fairfield,Ala. T2	4.60
Fontana,Calif. K1	5.25
Gary,Ind. U5	4.60
Geneva,Utah C11	4.60
Houston 85	4.70
Ind.Harbor,Ind. I-2	4.60
Johnstown,Pa. B2	4.65
KansasCity, Mo. S5	4.70
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.30
Minnequa,Colo. C10	4.90
Munhall,Pa. U5	4.60
Niles,Calif. P1	4.90
Portland,Oreg. O4	5.35
Phoenixville,Pa. P4	5.15
Seattle B3	5.35
S.Chicago U5, W14	4.60
S.SanFrancisco B3	5.25
Torrance,Calif. C11	5.30
Weirton,W.Va. W6	4.60

Wide Flange

Bethlehem,Pa. B2	4.65
Clairton,Pa. U5	4.60
Fontana,Calif. K1	5.40
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
Phoenixville,Pa. P4	5.15
S.Chicago,Ill. U5	4.60

Alloy Std. Shapes

Clairton,Pa. U5	5.65
Fontana,Calif. K1	7.30
Gary,Ind. U5	5.65
Houston 85	5.75
Munhall,Pa. U5	5.65
S.Chicago,Ill. U5	5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	6.75
Bessemer,Ala. T2	6.75
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.75
Fairfield,Ala. T2	6.75
Fontana,Calif. K1	7.40
Gary,Ind. U5	6.75
Geneva,Utah C11	6.75
Houston 85	6.85
Ind.Harbor,Ind. I-2, Y1	6.75
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	6.85
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.45
Munhall,Pa. U5	6.75
Seattle B3	7.50
S.Chicago,Ill. U5, W14	6.75
S.SanFrancisco B3	7.40
Struthers,O. Y1	6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.80
Lackawanna,N.Y. B2	6.80
Munhall,Pa. U5	6.75
S.Chicago,Ill U5	6.75

PILING

BEARING PILES

Bethlehem,Pa. B2	4.65
Lackawanna,N.Y. B3	4.65
Munhall,Pa. U5	4.60
S.Chicago,Ill. U5	4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.45
Lackawanna,N.Y. B2	5.45
Munhall,Pa. U5	5.45
S.Chicago,Ill. U5	5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Ashland,Ky.(15) A10	4.50
Bessemer,Ala. T2	4.50
Bridgeport,Conn. N19	4.75
Buffalo R2	4.50
Clairton,Pa. U5	4.50
Claymont,Del. C22	4.80
Cleveland J5, R2	4.60
Coatesville,Pa. L7	4.80
Conshohocken,Pa. A3	4.50
Detroit M1	4.60
Ecorse,Mich. G5	4.60
Fairfield,Ala. T2	4.50
Fontana,Calif.(30) K1	5.15
Gary,Ind. U5	4.50
Geneva,Utah C11	4.50
GraniteCity,Ill. G4	4.70
Harrisburg,Pa. P4	5.10
Houston 85	4.60
Ind.Harbor,Ind. I-2, Y1	4.50
Johnstown,Pa. B2	4.50
Lackawanna,N.Y. B2	4.50
LoneStar,Tex. L6	4.85
Mansfield,O. E6	4.50
Minnequa,Colo. C10	5.35
Munhall,Pa. U5	4.50
Newport,Ky. N9	4.50
Pittsburgh J5	4.50
Riverdale,Ill. A1	4.725
Seattle B3	5.40
Sharon,Pa. S3	4.50
S.Chicago R2, U5, W14	4.50
SparrowsPoint,Md. B2	4.50
Steubenville,O. W10	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Youngstown R2, U5, Y1	4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	5.65
Fontana,Calif. K1	6.30
Geneva,Utah C11	5.65
Johnstown Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5	6.725
Bessemer,Ala. T2	6.725
Clairton,Pa. U5	6.725
Cleveland J5, R2	6.725
Claymont,Del. C22	6.725
Coatesville,Pa. L7	6.725
Conshohocken,Pa. A3	6.725
Ecorse,Mich. G5	6.825
Fairfield,Ala. T2	6.725
Fontana,Calif.(30) K1	7.375
Gary,Ind. U5	6.725
Geneva,Utah C11	6.725
Houston 85	6.825
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
Munhall,Pa. U5	6.725
Pittsburgh J5	6.725
Seattle B3	7.625
Sharon,Pa. S3	6.725
S.Chicago,Ill. U5, W14	6.725
SparrowsPoint,Md. B2	6.725
Youngstown U5, Y1	6.725

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.30
Coatesville,Pa. L7	6.30
Fontana,Calif. K1	6.95
Gary,Ind. U5	6.30
Houston 85	6.40
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	6.30
Munhall,Pa. U5	6.30
Newport,Ky. N9	6.30
Seattle B3	7.20
Sharon,Pa. S3	6.30
S.Chicago,Ill. U5, W14	6.30
SparrowsPoint,Md. B2	6.30
Youngstown Y1	6.30

FLOOR PLATES

Cleveland J5	5.575
Conshohocken,Pa. A3	5.575
Harrisburg,Pa. P4	5.575
Ind.Harbor,Ind. I-2	5.575
Munhall,Pa. U5	5.575
S.Chicago,Ill. U5	5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.75
Ashland l.c.l. (15) A10	5.25
Cleveland c.l R2	5.10
Warren,O. c.l. R2	5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2	4.65
Aliquippa,Pa. J5	4.65
Alton, Ill. L1	4.85
Atlanta A11	4.85
Bessemer,Ala. T2	4.65
Birmingham C15	5.15
Bridgeport,Conn. N19	4.80
Buffalo R2	4.65
Canton,O. R2	4.75
Clairton,Pa. U5	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
FairlessHills,Pa. U5	4.80
Fontana,Calif. K1	5.35
Gary,Ind. U5	4.65
Houston 85	4.90
Ind.Harbor,Ind. I-2, Y1	4.65
Johnstown,Pa. B2	4.65
Joliet,Ill. P22	*5.15*
KansasCity,Mo. S5	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.35
Massillon,O. R2	4.75
Midland,Pa. C18	4.65
Milton,Pa. M18	4.65
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.00
N.Tonawanda,N.Y. B11	4.65
Pittsburg,Calif. C11	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
Seattle B3, N14	5.40
S.Chicago R2, U5, W14	4.65
S. Duquesne,Pa. U5	4.65
S.SanFran.,Calif. B3	5.40
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.35
Warren, O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown R2, U5	4.65

BARS, H.R. Leaded Alloy

Warren,O. C17	6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.575
Bridgeport,Conn. N19	5.725
Buffalo R2	5.575
Canton,O. R2, T7	5.575
Clairton,Pa. U5	5.575
Detroit R7	5.575
Ecorse,Mich. G5	5.675
Fontana,Calif. K1	6.625
FairlessHills,Pa. U5	5.725
Gary,Ind. U5	5.575
Houston 85	5.825
Ind.Harbor Ind. I-2, Y1	5.575
Johnstown,Pa. B2	5.575
KansasCity,Mo. S5	5.825
Lackawanna,N.Y. B2	5.575
LosAngeles B3	6.625
Massillon,O. R2	5.575
Midland,Pa. C18	5.575
S.Chicago R2, U5, W14	5.575
S.Duquesne,Pa. U5	5.575
Struthers,O. Y1	5.575
Warren,O. C17	5.575
Youngstown U5	5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.80
Bessemer,Ala. T2	6.80
Bethlehem,Pa B2	6.80
Clairton,Pa. U5	6.80
Cleveland R2	6.80
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	6.80
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.80
Houston 85	7.05
Ind.Harb.,Ind. I-2, Y1	6.80
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.50
Pittsburgh J5	6.80
Seattle B3	7.55
S. Chicago W14	6.80
S.Duquesne,Pa. U5	6.80
S.SanFrancisco B3	7.55
Struthers,O. Y1	6.80
Warren,O. R2	6.80
Youngstown U5	6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2	4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.65
Atlanta A11	4.85
Fontana,Calif. K1	5.35
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.00
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SanFrancisco S7	5.05

BAR SHAPES, Hot-rolled Alloy

Clairton,Pa. U5	5.65
Gary,Ind .U5	5.65
Houston 85	5.90
KansasCity,Mo. S5	5.90
Youngstown U5	5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18	8.325
Camden,N.J. P13	8.50
Chicago W18	8.325
Cleveland C20	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
SpringCity,Pa. K3	8.50
Warren,O. C17	8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	5.90
BeaverFalls,Pa. M12, R2	5.90
Buffalo B5	5.95
Camden,N.J. P13	6.35
Carnegie,Pa. C12	5.90
Chicago W18	5.90
Cleveland A7, C20	5.90
Detroit R7	5.90
Detroit B5, P17	6.10
Donora,Pa. A7	5.90
Elyria,O. W18	5.90
FranklinPark,Ill. S5	5.90
Gary,Ind. R2	5.90
GreenBay,Wis. P7	5.90
Hammond,Ind. L2, M13	5.90
Hartford,Conn. R2	6.40
Harvey,Ill. B5	5.90
LosAngeles R2, S30	7.35
Mansfield,Mass. B5	6.45
Massillon,O. R2, R8	5.90
Midland,Pa. C18	5.90
Monaca,Pa. S17	5.90
Newark,N.J. W18	6.35
NewCastle,Pa.(17) B4	5.90
Pittsburgh J5	5.90
Plymouth Mich. P5	6.15
Putnam,Conn. W18	6.45
Readville,Mass. C14	6.45
S.Chicago,Ill. W14	5.90
SpringCity,Pa. K3	6.35
Struthers,O. Y1	5.90
Waukegan,Ill. A7	5.90
Worcester,Mass. W19	6.35
Youngstown F3, Y1	5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	7.425
BeaverFalls,Pa. M12,R2	7.425
Bethlehem,Pa. B2	7.425
Buffalo B5	7.425
Camden,N.J. P13	7.60
Canton,O. T7	7.425
Carnegie,Pa. C12	7.425
Chicago W18	7.425
Cleveland A7, C20	7.425
Detroit R7	7.425
Detroit B5, P17	7.625
Donora,Pa. A7	7.425
Elyria,O. W8	7.425
Gary,Ind. R2	7.425
GreenBay,Wis P7	7.425
Hammond,Ind. L2,M13	7.425
Hartford,Conn. R2	7.725
Harvey,Ill. B5	7.425
Lackawanna,N.Y. B2	7.425
LosAngeles S30	9.10
Mansfield,Mass. B5	7.725
Massillon,O. R2, R8	7.425
Midland,Pa. C18	7.425
Monaca,Pa. S17	7.425
Newark,N.J. W18	7.60
Plymouth,Mich. P5	7.625
S.Chicago W14	7.425
SpringCity,Pa. K3	7.60
Struthers,O. Y1	7.425
Warren,O. C17	7.425
Waukegan,Ill. A7	7.425
Worcester,Mass. A7	7.725
Youngstown F3, Y1	7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	4.65
Atlanta A11	4.85
Birmingham C15	5.15
Buffalo R2	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
FairlessHills,Pa. U5	4.80
Fontana,Calif. K1	5.35
Ft. Worth,Tex.(42) T4	5.10
Gary,Ind. U5	4.65
Houston 85	4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... *5.15*
KansasCity,Mo. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 .... 5.40
SandSprings,Okla. S5 .. 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 .... 4.65
S.SanFrancisco B3 .... 5.40
SparrowsPoint,Md. B2 .. 4.65
Sterling,Ill(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 .. 6.45
Lackawanna,N.Y. B2 .. 6.17
Marion,O. P11 ..... 6.15
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ½-1" B2.. 6.15
Williamsport,Pa. S19 .. 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.50
ChicagoHts.(3) C2, I-2.. 4.65
ChicagoHts.(4) C2, I-2.. 4.65
Ft.Worth,Tex.(26) T4... 5.10
Franklin,Pa. (3) F5 .... 4.65
Franklin,Pa.(4) F5 .... 4.65
Marion,O.(3) P11 ..... 4.65
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3) B12 ..... *4.65*
Tonawanda(4) B12 ..... *5.15*
Williamsport,Pa.(3) S19 .4.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (B.R.) L5 .. 11.50
McK.Rks. (D.R.) L5 .. 16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 .... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 ... 4.35
Ecorse,Mich. G5 .... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 .. 4.375
Fontana,Calif. K1 .... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 .... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37).. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 ... 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 ... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 ..... 4.55
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2 .. 4.325
Steubenville,O. W10 ... 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .... 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R.(19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .. 6.375
Ecorse,Mich. G5 ..... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 ... 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2.. 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1 .. 6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ... 4.575
Ind.Harbor,Ind. I-2.... 4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 .... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 .... 5.425
Fairfield,Ala. T2 ..... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity,Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2 .. 5.325
Steubenville,O. W10 .. 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.875
Dravosburg,Pa. U5 .. 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .. 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2.. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 .... 5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky.	A10 6.90	...
Canton,O.	R2 ... 6.10	6.55
Dravosburg	U5 .. 6.10	...
Fairfield	T2 .... 6.10	...
Gary,Ind.	U5 .... 6.10	6.35
Ind.Harbor	I-2 .. 6.10	6.35
Kokomo,Ind.	C16 6.20	...
MartinsFry.	W10 6.10	...
Newport,Ky.	N9 .. 6.10	6.35
Pitts.,Calif.	C11 .. 6.85	...
SparrowsPt.	B2.. 6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry.,O. W10 .... 6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City, Ala. R2 .... 5.85‡
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85‡
Dover,O. R1 ..... 5.85†
Dravosburg,Pa. U5 ... 5.85†
Fairfield,Ala. T2 ..... 5.85*
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 .... 6.05‡
Ind.Harbor,Ind. I-2 ... 5.85†
Kokomo,Ind. C16 .... 5.95‡
MartinsFerry,O. W10 .. 5.85*
Middletown,O. A10 .. 5.85†
Newport,Ky. N9 ..... 5.85‡
Niles,O. N12 ..... 6.85‡
Pittsburg,Calif. C1 .... 6.60*
SparrowsPt.,Md. B2 .. 5.85†
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 .... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25
Niles,O. N12 ..... 7.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 ..... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 .... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 .... 6.10
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. N12 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 .. 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. N12 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .... 6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Ingoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) B2 ..4.325
Allenport, Pa. P7 .....4.325
Alton, Ill. L1 .....4.50
Ashland, Ky. (8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer, Ala. T2 .....4.325
Birmingham C15 .....4.825
Bridgeport, Conn. N19 ..4.625
Buffalo (27) R2 .....4.325
Conshohocken, Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse, Mich. G5 .....4.425
Fairfield, Ala. T2 .....4.325
Fontana, Calif. K1 ....5.075
Gary, Ind. U5 .....4.325
Ind. Harbor, Ind. I-2, Y1 .4.325
Johnstown, Pa. (25) B2 ..4.325
Lackaw'na, N.Y. (24) B2 4.325
LosAngeles (25) B3 ....5.075
Milton, Pa. M18 .....4.325
Minnequa, Colo. C10 ..5.425
NewBritain (10) S15 ...4.325
N. Tonawanda, N.Y. B11 4.325
Pittsburg, Calif. C11 ..5.075
Portsmouth, O. P12 ....4.325
Riverdale, Ill. A1 .....4.55
SanFrancisco S7 .....5.05
Seattle (25) B3 .....5.325
Seattle N14 .....5.40
Sharon, Pa. S3 .....4.325
S. Chicago, Ill. W14 ....4.325
S. SanFrancisco (25) B3 .5.075
SparrowsPoint, Md. B2 ..4.325
Sterling (1) N15 .....4.325
Sterling, Ill. N15 .....4.425
Torrance, Calif. C11 ...5.075
Warren, O. R2 .....4.325
Weirton, W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. N19 ..7.50
Carnegie, Pa. S18 .....7.20
Fontana, Calif. K1 ....8.65
Gary, Ind. U5 .....7.20
Ind. Harbor, Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport, Ky. N9 .....7.20
Sharon, Pa. S3 .....7.20
S. Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer, Ala. T2 ....6.425
Conshohocken, Pa. A3 ..6.425
Ecorse, Mich. G5 .....6.525
Fairfield, Ala. T2 .....6.425
Fontana, Calif. K1 ....7.525
Gary, Ind. U5 .....6.425
Houston S5 .....6.675
Ind. Harbor, Ind. I-2, Y1 6.425
KansasCity, Mo. S5 ....6.675
Lackawanna, N.Y. B2 ..6.425
LosAngeles (25) B3 ....7.175
Seattle (25) B3 .....7.425
Sharon, Pa. S3 .....6.425
S. SanFrancisco (25) B3 .7.175
SparrowsPoint, Md. B2 ..6.425
Warren, O. R2 .....6.425
Weirton, W.Va. W6 ....6.425
Youngstown U5, Y1 ....6.425

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ..4.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 ....6.25
Baltimore T6 .....6.25
Boston T6 .....6.60
Buffalo S49 .....6.25
Cleveland J5 .....6.25
Cleveland A7 .....6.25
Conshohocken, Pa. A3 ...6.30
Dearborn, Mich. D3 ....6.35
Detroit D2, M1, P20 ...6.35
Dover, O. G6 .....6.25
Ecorse, Mich. G5 .....6.35
Follansbee, W.Va. F4 ..6.25
Fontana, Calif. K1 .....8.10
Franklin Park, Ill. T6 ...6.35
Ind. Harbor, Ind. I-2 ....6.35
Ind. Harbor, Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna, N.Y. B2 ..6.25
LosAngeles C1 .....8.30
NewBedford, Mass. R10 ..6.70
NewBritain (10) S15 ...6.25
NewCastle, Pa. B4, E5 ..6.25
NewHaven, Conn. A7 .....6.70
NewHaven, Conn. D2 ...6.70
NewKensington, Pa. A6 ..6.25
Pawtucket, R.I. R3 ....6.90
Pawtucket, R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Portsmouth, O. P12 ....6.25
Riverdale, Ill. A1 .....6.35
Rome, N.Y. (32) R6 ....6.25
Sharon, Pa. S3 .....6.25
SparrowsPt., Md. B2 ....6.25
Trenton, N.J. (31) R5 ...7.60
Wallingford, Conn. W2 ..6.70
Warren, O. R2, T5 ....6.25
Weirton, W.Va. W6 ....6.25
Worcester, Mass. A7 ....6.80
Youngstown Y1 .....6.25
Youngstown C8 .....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie, Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover, O. G6 .....13.45
FranklinPark, Ill. T6 ..13.45
Harrison, N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket, R.I. N8 ....13.80
Sharon, Pa. S3 .....13.45
Worcester, Mass. A7 ..13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn, Mich. D3 ....9.20
Dover, O. G6 .....9.30
Ecorse, Mich. G5 .....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol, Conn. W1	...	...	10.80	12.95	15.65
Carnegie, Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn, Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover, O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee, W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark, Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison, N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain, Conn. (10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle, Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven, Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington, Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket, R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale, Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome, N.Y. (32) R6	7.00	8.95	10.50	12.65	15.35
Sharon, Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton, N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford, Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren, O. T5	7.00	8.95	10.50	12.65	15.35
Weirton, W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester, Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester, Mass. A7	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol, Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark, Ill. T6	....	...	14.90	18.10	21.50
Harrison, N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton, N.J. R5	...	...	14.40	17.60	21.00
Worcester, Mass. W12	....	...	14.40	....	....
Worcester, Mass. A7, T6	...	...	14.40	17.60	21.00
Youngstown C8	...	...	14.75	17.95	21.35

Ind. Harbor, Ind. Y1 ....9.30
Lackawanna, N.Y. B2 ..9.10
Sharon, Pa. S3 .....9.10
SparrowsPoint, Md. B2 ..9.10
Warren, O. R2 .....9.10
Weirton, W.Va. W6 ....9.10
Youngstown Y1 .....9.30

STRIP, Electrogalvanized

Cleveland A7 .....6.25*
Dover, O. G6 .....6.25*
Riverdale, Ill. A1 .....6.35*
Youngstown C8 .....6.25*
Warren, O. T5 .....6.25*
Warren, O. B9 .....6.45*
Weirton, W.Va. W6 ....5.75*
*Worcester, Mass. A7 ....6.30**

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon, Pa. S3 .....6.55

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.05
Riverdale, Ill. A1 .....4.90
Sharon, Pa. S3 .....4.75
Youngstown U5 .....4.75

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge, Pa. A4	...	...	9.95	10.95	11.85
Mansfield, O. E8	8.40	9.35	9.95	10.95	11.85
Newport, Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles, O. N12	8.40	9.35	9.95	10.95	....
Vandergrift, Pa. U5	...	9.35	9.95	10.95	11.85
Warren, O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville, O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge, Pa. A4	...	...	10.70	11.70	12.80
GraniteCity, Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor, Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift, Pa. U5	....	....	10.10†	10.70†	11.70† 12.60†
Vandergrift, Pa. U5	....	9.60*	10.20*	11.20*	12.10*
Warren, O. R2	8.60†	10.10	10.70	11.70	12.80

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	12.90	13.35	13.85	14.35
Brackenridge, Pa. A4	12.80	....	....	....
Newport, Ky. N9	12.80	....	....	....
Vandergrift, Pa. U5	12.90	13.35	13.85	14.35
Zanesville, O. A10	12.80‡	13.35‡	13.85‡	14.35‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge, Pa. A4	....	15.85	17.45	17.95	13.85‡
Butler, Pa. A10	....	....	17.45	17.95	....
Vandergrift, Pa. U5	14.35	15.85	17.45	17.95	13.85
Warren, O. R2	....	....	....	....	13.85‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.90	$8.15	$8.55
Dravosburg, Pa. U5	7.90	8.15	8.55
Fairfield, Ala. T2	8.00	8.25	8.65
FairlessHills, Pa. U5	8.00	8.25	8.65
Gary, Ind. U5	7.90	8.15	8.55
GraniteCity, Ill. G4	8.00	8.25	8.65
IndianaHarbor, Ind. I-2, Y1	7.90	8.15	8.55
Niles, O. R2	7.90	8.15	8.55
Pittsburg, Calif. C11	8.65	8.90	9.30
SparrowsPoint, Md. B2	8.00	8.25	8.65
Weirton, W.Va. W6	7.90	8.15	8.55
Yorkville, O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa, Pa. J5	6.575	....	....
Niles, O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$9.20	$9.45
Dravosburg, Pa. U5	9.20	9.45
Fairfield, Ala. T2	9.30	9.55
Fairless, Pa. U5	9.30	9.55
Gary, Ind. U5	9.20	9.45
Ind. Har. I-2, Y1	9.20	9.45
Pitts., Calif. C11	9.95	10.20
Sp.Pt., Md. B2	9.30	9.55
Weirton, W.Va. W6	9.20	9.45
Yorkville, O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa, Pa. J5 .....$7.00
Dravosburg, Pa. U5 ....7.00
Fairfield, Ala. T2 .....7.10
FairlessHills, Pa. U5 ....7.10
Gary, Ind. U5 .....7.00
GraniteCity, Ill. G4 ....7.10
Ind. Harbor, Ind. I-2, Y1 7.00
Niles, O. R2 .....7.00
Pittsburg, Calif. C11 ...7.75
SparrowsPoint, Md. B2 ..7.10
Warren, O. R2 .....7.00
Weirton, W.Va. W6 ....7.00
Yorkville, O. W10 .....7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg, Pa. U5 ....6.65
Gary, Ind. U5 .....6.65
GraniteCity, Ill. G4 ....6.75
Ind. Harbor, Ind. Y1 ....6.65
Yorkville, O. W10 .....6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg, Pa. U5 ...$8.70
Gary, Ind. U5 .....8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville, O. W10 .....$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary, Ind. U5 .....$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..6.25
Aliquippa, Pa. J5 .....6.25
Alton, Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville, Ill. K4 ....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville, Ind. M8 .6.35
Donora, Pa. A7 .....6.25
Duluth, Minn. A7 .....6.25
Fairfield, Ala. T2 .....6.25
Fostoria, O. (24) B1 ....6.45
Houston S5 .....6.50
Jacksonville, Fla. M8 ...6.77
Johnstown, Pa. B2 .....6.25
Joliet, Ill. A7 .....6.25
KansasCity, Mo. S5 ....6.50
Kokomo, Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa, Colo. C10 ....6.50
Monessen, Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N. Tonawanda B11 ....6.25
Palmer, Mass. W12 ....6.55
Pittsburgh, Calif. C11 ...7.20
Portsmouth, O. P12 ....6.25
Rankin, Pa. A7 .....6.25
S. Chicago, Ill. R2 .....6.25
S. SanFrancisco C10 ....7.20
SparrowsPoint, Md. B2 ..6.35
Sterling, Ill. (1) N15 ....6.25
Sterling, Ill. N15 .....6.35
Struthers, O. Y1 .....6.25
Waukegan, Ill. A7 .....6.25
Worcester, Mass. A7 ....6.55

WIRE, MB Spring, High Carbon

Aliquippa, Pa. J5 .....7.90
Alton, Ill. L1 .....8.075
Bartonville, Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora, Pa. A7 .....7.90
Duluth, Minn. A7 .....7.90
Fostoria, O. B1 .....7.95
Johnstown, Pa. B2 .....7.90
LosAngeles B3 .....8.85
Millbury, Mass. (12) N6 ..8.20
Minnequa, Colo. C10 ....8.15
Monessen, Pa. P16 .....7.90
Muncie, Ind. I-7 .....8.10
Palmer, Mass. W12 .....8.20
Pittsburg, Calif. C11 ...8.85
Portsmouth, O. P12 .....7.90
Roebling, N.J. R5 .....8.20
S. Chicago, Ill. R2 .....7.90
S. SanFrancisco C10 ....8.85
SparrowsPt., Md. B2 ....8.00
Struthers, O. Y1 .....7.90
Trenton, N.J. A7 .....8.20
Waukegan, Ill. A7 .....7.90
Worcester A7, J4, T6, W12 .8.20

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....7.60
Alton, Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora, Pa. A7 .....7.60
Duluth, Minn. A7 .....7.60
Johnstown, Pa. B2 .....7.60
KansasCity, Mo. S5 .....7.85
LosAngeles B3 .....8.55
Minnequa, Colo. C10 ...7.775
Monessen, Pa. P18 .....7.60
NewHaven, Conn. A7 ....7.90
Palmer, Mass. W12 .....7.90
Pittsburg, Calif. C11 ....8.55
Portsmouth, O. P12 .....7.60
Roebling, N.J. R5 .....7.90
S. Chicago, Ill. R2 .....7.60
S. SanFrancisco C10 ....8.55
SparrowsPoint, Md. B2 ..7.70
Struthers, O. Y1 .....7.60
Trenton, N.J. A7 .....7.90
Waukegan, Ill. A7 .....7.60
Worcester, Mass. A7 ....7.90

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....12.725
Bartonville, Ill. K4 ....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville, Ind. M8 .12.65
Fostoria, O. B1 .....12.55
Jacksonville, Fla. M8 ...13.08
Johnstown, Pa. B2 .....12.55
Kokomo, Ind. C16 .....12.55
Minnequa, Colo. C10 ....12.30
Monessen, Pa. P16 .....12.55
Muncie, Ind. I-7 .....12.75
Palmer, Mass. W12 .....12.85
Roebling, N.J. R5 .....12.85
S. SanFrancisco C10 ....12.90
Waukegan, Ill. A7 .....12.55
Worcester, Mass. A7, T6 .12.85

WIRE, Gal'd ACSR for Cores

Bartonville, Ill. K4 ....10.70
Buffalo W12 .....10.70
Johnstown, Pa. B2 .....10.70
Minnequa, Colo. C10 ....10.525
Monessen, Pa. P16 .....10.70
Muncie, Ind. I-7 .....10.90
Pittsburg, Calif. C11 ...11.50
Portsmouth, O. P12 .....10.70
Roebling, N.J. R5 .....11.00
SparrowsPt., Md. B2 ....10.80

ROPE WIRE (A)

Bartonville, Ill. K4 ....10.55
Buffalo W12 .....10.55
Fostoria, O. (23) B1 ....10.05
Johnstown, Pa. B2 .....10.55
Monessen, Pa. P16 .....10.55
Muncie, Ind. I-7 .....10.75
Palmer, Mass. W12 .....10.55
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.55
SparrowsPt. B2 .....10.65
Struthers, O. Y1 .....10.55
Worcester, Mass. J4 ....10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	9.00
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	9.35
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.43
S.Chicago,Ill. R2	9.35
SparrowsPt.,Md. B2	9.45
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	9.65
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B3	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.13
S.Chicago,Ill. R2	9.65
SparrowsPt.,Md. B2	9.75
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	9.70
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	10.50
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.50
S.Chicago,Ill. R2	9.70
SparrowsPt.,Md. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172‡
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	179*
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN Fence, 9-15 ga. Col.

Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Ala.City, 18 ga. R2	267**
Aliq'ppa,Pa.9-14½ga J5	165‡
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity, Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	168*
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

Wire (16 Gage)	An'ld Galv. Stone	Stone
Ala.City R3	14.60	16.05**
Bartonville K4	14.60	16.55
Buffalo W12	14.50	....
Cleveland A7	14.80	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.90	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.925‡
Atlanta A11	7.50 8.10
Bartonville(48) K4	7.50 8.10
Buffalo W12	7.40 8.80†
Cleveland A7	7.40 ....
Crawfordsville M8	7.50 8.10
Donora,Pa. A7	7.40 7.80†
Duluth,Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston,Tex. S5	7.65 8.05†
Jacks'ville,Fla. M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen E7 (48)	7.40 7.975*
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	8.35 8.75†
Portsmouth,O. P12	7.40 ....
Rankin A7	7.40 7.80†
S.Chicago R2	7.40 7.80**
S.SanFran. C10	8.35 8.75**
Spar'waPt.B2(48)	7.50 8.075*
Str'ling(1)(48)N15	7.40 8.00††
Struthers,O.(48)Y1	7.40 7.90‡
Worcester,Mass.A7	7.70 ....

*Based on 12.50c zinc; †5c zinc; ‡10c zinc; ‡‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	173
Atlanta A11	175
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth,Minn. A7	173
Fairfield,Ala. T2	173
Joliet,Ill. A7	173
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
S.Chicago R2	173
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	175
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
- ↑½" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted):
- ½" x 6" and smaller. 61

↑½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:
- ½" and smaller 42
- Larger than ½" diam. and all diams. longer than 6" 32

Lag Bolts
- All diams. & 6" and shorter 61
- All diams. longer than 6" 55

Plow, Tap & Blank Bolts
- ½" x 6" and smaller. 61
- Larger than ½" diam. and all diams. longer than 6" 55

Ribbed Neck, Carriage, Step, Elevator, Fitting-Up and Tire Bolts:
- All sizes 61

STOVE BOLTS, SLOTTED (nuts not attached; bulk)
- ¼" to ¼" diam. incl., 3" or shorter:
  - 25,000 to 199,999 pieces 61
  - 200,000 or more pieces 64
- 5/16" to ½" diam. incl., 3" or shorter:
  - 15,000 to 99,999 pieces 61
  - 100,000 or more pieces 64
- Longer than 3", any diam.:
  - 5000 to 99,999 pieces. 61
  - 100,000 or more pieces 64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under..List less 22½

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.13	33.72
2½	13	37.73	44.63	36.60
2¾	13	41.57	49.16	40.31
3	13	45.09	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	....	....	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	....	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
KansasCity,Mo. S5	12.40
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.823
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2, Y1	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.838

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.80
Ind.Harbor,Ind. I-2, Y1	7.80
KansasCity,Mo. S5	7.80
Lebanon,Pa. B2	7.80
Minnequa,Colo. C10	7.80
Pittsburgh J5	7.80
Seattle B3	8.40
S.Chicago,Ill. R2	7.80
Struthers,O. Y1	7.80
Youngstown R2	7.80

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+% Fe, annealed.	9.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.e.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh).	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper:	
Electrolytic	36.75
Reduced	36.75
Lead	22.50
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	86.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50†
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb.	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 0.25c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Dedd. San Francisco Bay area.
(23) Mild plow, 10.50c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill zone.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 0.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 0.20c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 10 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 0.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 0.25c.
(43) 9-14½ Ga.
(44) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		93c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.66		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Youngstown R3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. P6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	14.5	+0.75	17.5	1.75	20	4.75	22.5	6
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	23	7	23.5	7.5	25	7.75	25	7.75	15.5	+0.25	15.15	+0.22
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	25	9	25.5	9.5	27	9.75	27	9.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	34.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	36.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	27.25	48.00	42.25	72.25	66.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	27.25	48.25	42.75	72.75	73.50	74.50	77.00	83.75	83.75
321	26.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
15-5CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	....	28.75	33.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless:	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	29.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.00	....
Monel	43.95	59.50	....
Copper*	....	....	46.00

	Strip, Carbon Base—Cold Rolled— 10%	Strip, Carbon Base—Cold Rolled— Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.8	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.160
6	4	2	....	5	1.105
6	4	3	....	5	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A5, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.79	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59 00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	59.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	60.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $3 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$47.50
Buffalo H1	48.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	*95.50*
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	*98.50*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Pittsburgh P6 (Intermediate) (Phos. 0.036-0.075% max.)	63.50

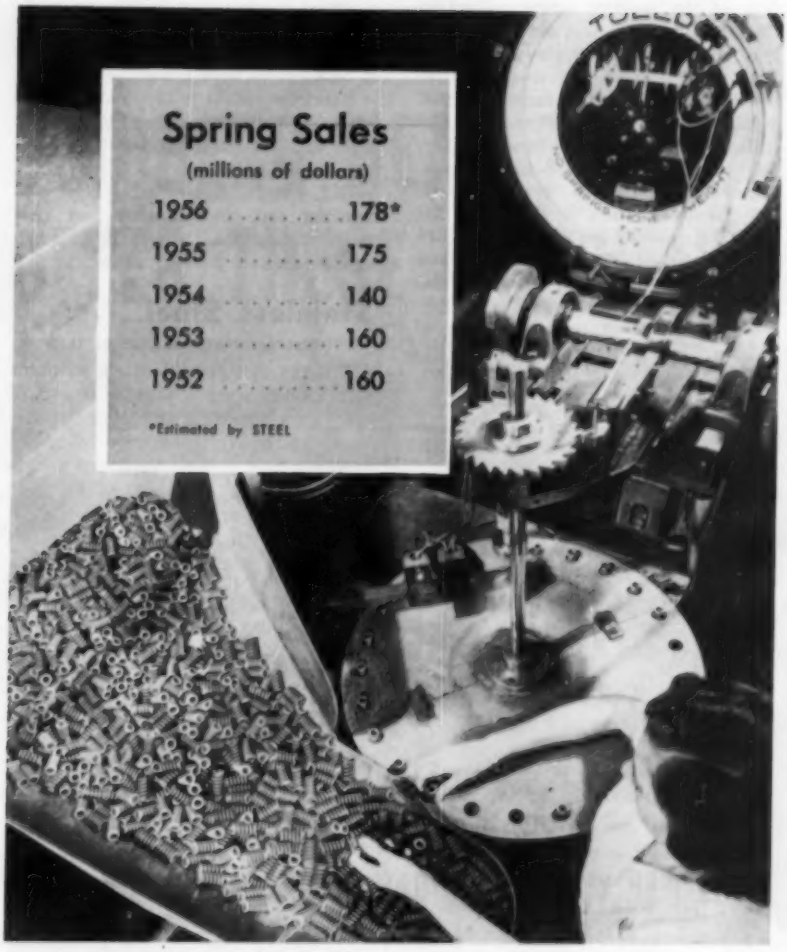
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.¶	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.43	9.30	....	7.63	7.49	9.43
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62§	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.35	....	7.06	...	7.08	9.25	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.13	....	7.45	7.28	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.20	...	7.22	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.65	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.89	9.30
Jackson, Miss.	7.10	8.20	9.30	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.48	7.08	8.85
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	9.09**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.00
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.38	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25§	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00‡	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **⅜-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—500 to 9999 lb; ¶—400 to 999 lb; ‡—4000 lb and over; ‖—1000 to 1999 lb; ¢—1000 lb and over; ▽—1500 to 3999 lb; ▲—2000 to 3999 lb; ●—f.o.b. local delivery in lots of 10,000 lb and over.



Compression springs are load tested for accuracy

Step Up in Spring Sales

MECHANICAL and precision spring sales are stretching to an all-time peak of $175 million this year.

That's a comfortable increase over 1954 when sales slumped to $140 million as high inventories were worked off. In 1952-53, sales for 200 spring companies reached $160 million each year.

Next year, sales should continue at about the same pace—or higher. Springmakers say that although inventories at the start of 1956 are low, order books are well filled through the first quarter.

Autos Cause Surge—Record automobile production is a major factor in this year's sales spurt. Each car today uses about 150 springs or resilient parts. They last longer, too—a far cry from the early days, when drivers carried extra valve springs in their toolboxes. Those springs had to be replaced every few hundred miles. Now they last indefinitely.

Aircraft manufacturers will be another big user this coming year. Auxiliary equipment for airplanes has springs capable of operating at stresses up to 140,000 psi in small wire sizes.

Latest efforts are aimed at increasing tensile strength and temperature resistance in springs for jet aircraft and atomic powered units. The industry is searching for spring metals which can withstand 100,000 psi at 1000° F. Nickel and chromium alloys can be used up to 900° F.

Conductivity—"Our largest customers for beryllium-copper alloy springs are in the electrical and electronics industries," says W. S. Pollard, sales promotion manager, the Beryllium Corp., Reading, Pa. "Both are expanding, and we expect continued increase in use of these alloys in 1956."

Largest use of beryllium-copper alloy springs is for flat or cantilever type, with snap action springs a close second. Electrical conductivity, wear resistance and the ability to be formed into intricate shapes are "musts" for springs used by these industries.

Materials—About 130,000 tons of steel, mostly wire and flat springs, will be used this year. This does not include upholstery coils. These steels range from $350 to $2000 per ton.

Although most springs are made from high-carbon wire, ranging from 0.007 to ⅝-in. in diameter, increasing use is being made of higher tensile alloys for operation at extreme temperatures and greater stresses.

Precision Machinery—Accuracy and versatility mark new spring-making machine designs. Torrington Mfg. Co., Torrington, Conn., has developed two, new, torsion-spring winders. Production speeds range from 20 to 120 springs per minute, depending on wire sizes and complexity of design.

One Torrington machine is equipped with an electronic adjustable-speed drive, so it can turn out 240 springs every minute.

Wire . . .

Wire Prices, Pages 130 & 131

Wire rods and manufacturers wire are in tight supply. Producers are accepting tonnage for the first quarter on a limited basis—and strictly within historic order patterns of customers. Merchant wire items are in easy supply. Some products are available for shipment within a week to ten days.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 129 & 130

Cutbacks in automobile assemblies by several companies early in December are not being translated into cancellations or delivery deferments of hot-rolled and cold-rolled sheets. There is considerable doubt whether auto builders are fully covered on steel supply for the blistering production schedules they originally projected for the first quarter. The reduction in assemblies will merely serve to bring a closer match between requirements and supply.

Some sheetmakers are making headway in cutting down arrearages in hot-rolled sheets, but they doubt that they will be current with demand before the end of first quarter, if

then. They are making less progress in balancing commitments in cold-rolled sheets, and it appears they will have little more tonnage to offer in the first quarter than they did in the period now closing. Except specialties, no new tonnage is being offered for the second quarter. Stainless steel is available. At least one maker is booked through June on nickel-bearing sheets and strip. There has not been as much buying pressure for second quarter tonnage.

Sheet producers generally have followed the lead of U. S. Steel in revising certain extras, and they are expected to follow the more recent action of the leading seller (effective Dec. 12) in reducing shrouding extras from 5 to 2.5 cents per 100 lb. This is a logical follow-up on the earlier reduction in packaging extras.

Most sheet mills have parceled out tonnage for the entire first quarter, few going on a month-to-month basis. Consumers generally would like to get far more than is scheduled for them. In some instances, they are arranging for conversion tonnage and are paying premiums for material from other than regular supply sources. There is not too much of this class of buying.

Acme Steel Co., Chicago, announced increases in extras on cold-rolled carbon strip and high carbon strip, effective Dec. 7. No changes in base prices were made.

Republic Steel Corp. announced price adjustments affecting certain size, quality, chemistry and packaging extras on hot-rolled sheets, cold-rolled sheets, hot-rolled strip, galvanized flat and formed and galvannealed sheets. The revised extras are dated Dec. 3.

Stainless Steel . . .

Stainless Steel Prices, Page 132

Rumors of a possible price increase on nickel-bearing grades of stainless steel are circulating at Pittsburgh because of the continued rise in prices paid for 18-8 scrap. Principal stainless producers are said to be well stocked with scrap, but other buyers say almost "unbelievable" prices are being paid for material. Brokers quote $350 a ton on 18-8 bundles and solids. In January, the prevailing range was $190-$200.

Steel Bars . . .

Bar Prices, Page 128

Hot-rolled carbon bar consumers, not being able to get as much tonnage as they want, are sending orders to mills, requesting that they be held pending openings in schedules.

Producers generally are turning down these orders. The reason: It is not considered good policy. Holding orders implies an obligation on the part of the mill to fill them.

Producers of rail steel bars report demand is "terrific."

Tool Steel . . .

Tool Steel Prices, Page 132

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 10,095 net tons in October, reports the American Iron & Steel Institute. This was an increase over the 9418 tons moved in the preceding month, and was considerably greater than the 6587 tons shipped in October, 1954.

Tin Plate . . .

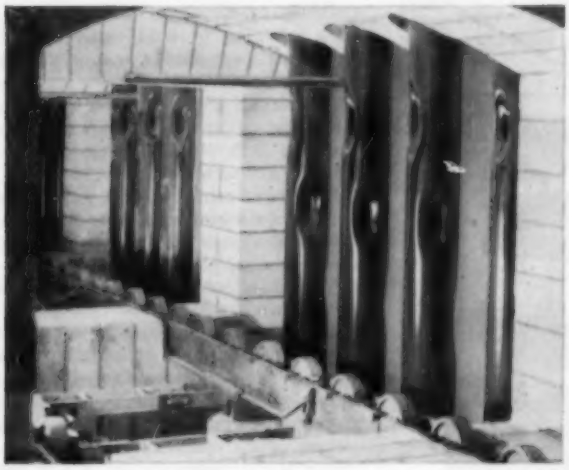
Tin Plate Prices, Page 130

October shipments of tin cans (501,455 tons) were off seasonally from September—about 2 per cent. But they were well ahead of the 361,676 tons shipped in October, 1954. The total for the first ten months of this year was 3,951,886 tons, according to the U. S. Census Bureau. This compares with 3,586,327 in the like 1954 period.

Shipments of fruit and vegetable cans in October amounted to 200,216 tons. In the like month a year ago,

Whatever your source of heat...

LINDBERG HEAT TREATING FURNACES OFFER THESE EXCLUSIVE ADVANTAGES



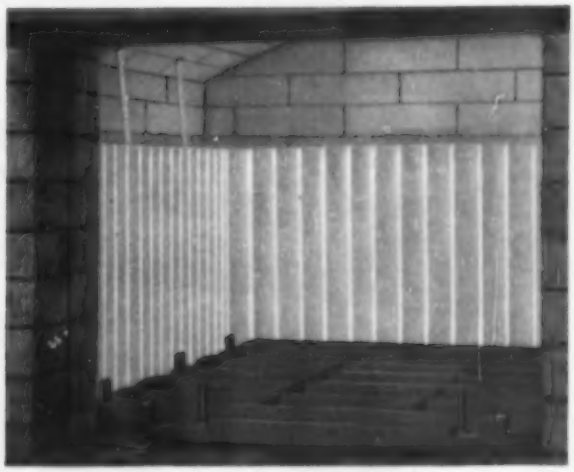
... IN THE GAS-FIRED FURNACE

NEW LINDBERG VERTICAL RADIANT TUBE

Because of its revolutionary design, this tube provides a new level of gas-fired furnace performance. The secret lies in the new Lindberg tube's "dimples." The tube carries a central stream of mixed air-and-gas surrounded by a cylindrical stream of air alone. Combustion occurs in the area between these two streams. The "dimples" create eddies accelerating combustion and maintaining even temperatures along the entire tube.

This Lindberg tube will operate at maximum efficiency for a longer period of time. The special protective coating gives greatest possible resistance to carbon penetration. Vertical position eliminates soot deposit and resultant temperature increases at points of sooting.

Tubes are 59 inches long, weigh only 29 pounds, changeable in a few minutes. No costly furnace shutdowns nor high labor and material cost for tube changes.



... IN THE ELECTRIC FURNACE

NEW LINDBERG CORRTHERM ELEMENT

CORRTHERM, Lindberg's radically advanced new electric heating element offers advantages never before available for heat treating furnaces. With this new element carburizing and carbonitriding with electricity becomes practical, efficient and economical. Ideal, too, in other types of Lindberg electric furnaces.

The outstanding feature of the CORRTHERM element is the extremely low voltage at which it operates. Consequently, leakage through carbon saturation and shock or short hazards are eliminated. Elements also act as baffles to direct circulation of convection streams.

CORRTHERM elements are practically indestructible. Work load or operator's charging tool can't hurt them. Watts density is at all time low. Easily installed or replaced, too, as element merely hangs in furnace and no complicated mountings are required.

Lindberg Field representatives in 21 cities are ready to show you how Lindberg furnaces with these revolutionary new elements can improve your heat treating process. You'll find your Lindberg representative's name in the classified section of the phone book or write us direct.

LINDBERG FURNACES

LINDBERG ENGINEERING COMPANY
2441 W. Hubbard Street • Chicago 12, Illinois

125,066 tons were moved. The total for the first ten months of this year was 1,368,860 tons, against 1,210,367 a year ago.

The next leading classification, beer cans, in October had shipments amounting to 64,096 tons, against 47,561 in October, 1954. Total for the first ten months was 647,615 tons, compared with 563,060 in the like 1954 period.

Demand for tin plate continues strong. Some of the strength comes from exports. In the first nine months of this year, 22 per cent of all steel exports was tin plate. South American countries are good customers.

Plates . .

Plate Prices, Page 128

Inquiry for plates continues well in excess of shipments. This situation probably will remain throughout the first quarter and possibly through the first half of next year. In an effort to keep commitments within bounds, some mills have not opened books for the entire first quarter—tonnage is earmarked for regular customers, with few exceptions, on a limited basis. Exceptions include rated work, mostly government requirements, and railroad car work.

Platemakers are planning heavy shipments on railroad car account in first half. Some substantial car lists are still pending, primarily because of uncertainties with respect to steel supply. A Northern New Jersey car shop recently was forced to suspend because it lacked steel.

Tubular Goods . . .

Tubular Goods Prices, Page 133

The National Tube Division, U. S. Steel Corp., Pittsburgh, last week announced certain revisions in prices for standard and line pipe, effective Dec. 13. All standard and line butt-weld pipe, ⅛ to 4 in., are reduced about $2 per ton. A charge of 6 per cent is established for quantities of less than 1 ton of standard and line pipe ordered for shipment in carloads with other pipe to one destination at one time.

The 5-per-cent discount previously granted for standard pipe and grades, and B line pipe, shipped to jobbers' stocks or to plant locations of certain classes of pipe fabricators, is withdrawn.

Columbia-Geneva Steel Division of U. S. Steel announced establishment of prices for electricweld line pipe to be produced at the new pipe mill at Geneva, Utah. The following are mill prices for specification API-5-L, grade B line pipe: 4½-in., $78.90 per 100 ft; 6⅝-in., $117.76; 8⅝-in., $152.10; 10¾-in., $194.12.

Mill prices are also established for specification API-5-LX, grade X-42 line pipe in diameters larger than 4½-in. as follows: 6⅝-in., $118.40; 8⅝-in., $152.93; 10¾-in., $195.17.

Shipments from the new mill commence Jan. 1 and will be subject to Columbia-Geneva's mill prices and extras in effect at time of shipment.

The Etna, Pa., plant of National Supply Co. set a monthly shipping record in November. It lends support to a recent prediction of A. W. McKinney, president of the company. He expects the firm's sales in 1955 will probably set a record, citing the high level of general and residential construction as factors. The Etna plant produces steel pipe and electrical conduit.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 128

Prices are firmer in New England on concrete reinforcing bars and highway mesh. Strength is especially noticeable in bars. Twelve cents or higher is generally quoted for bars in place.

Area distributors in some cases are overbooked, with deliveries more extended and supplies continuing to tighten.

Additional capacity for wider

panels is coming in for welded fabric, but the volume of heavier wire mesh is not increasing.

Deliveries of bearing and sheet piling are more extended—through the second quarter at some mills.

Reinforcing bar mills are operating close to capacity in the Pacific Northwest.

Structural Shapes . . .

Structural Shape Prices, Page 138

Structural steel shortages are forcing the delay of some projects on which work already is under way. Builders are moving cautiously in taking on new commitments, especially with fabricators quoting steel deliveries running 11 to 12 months in some cases. There is still a lot of work around, however.

Higher fabricated structural steel prices show up in contract estimates for Connecticut turnpike bridges. Substantial tonnages of beam work in place have sold at $15.50 per pound and riveted plate girders at just under 23 cents.

Structural contracts are running ahead of those a year ago. October bookings totaled 308,780 tons, up 45 per cent from October, 1954, reports the American Institute of Steel Construction. In September, 339,461 tons were booked.

Bookings for the first ten months this year were 2,982,404 tons, up 41 per cent from the 2,117,500 tons in the like 1954 period.

October shipments were 283,768 tons, down slightly from the September peak of 289,128. In the first ten months, shipments amounted to 2,475,367 tons, off 8 per cent from the 2,683,288 shipped in the corresponding 1954 period.

Order backlogs on Oct. 30 totaled 1,927,811 tons. Of the total, 1,068,410 tons were scheduled for fabrication through February.

Ferroalloys . . .

Ferroalloy Prices, Page 142

Rising costs, particularly for ore and scrap, make necessary price increases for some manganese alloys and 50-per-cent ferrosilicon alloys, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., announced last week. Average increase for the manganese alloys amounts to 3.6 per cent; for the silicon alloys, 7.6 per cent. The new prices become effective Jan. 1 for contract users and immediately on a spot basis.

All grades of silicomanganese, low-carbon ferromanganese and 50 per cent ferrosilicon are increased, but quantity, sizing, packing and spot differentials remain unchanged. Exceptions: The packing differential for standard ferromanganese is increased ¼-cent; the packing differential for low-carbon ferromanganese is increased 3/10-cent; and the less carload quantity differential is increased by 4/10-cent.

Vanadium Corp. of American last week advanced 22.25 per cent ferrosilicon 1.25 cents per pound contained.

E. J. Lavino & Co., Philadelphia, advanced its price on standard ferromanganese $15 a ton to $205, Sheridan, Pa., furnace, effective Dec. 9. This is the company's first increase on this product in three years.

Warehouse . . .

Warehouse Prices, Page 133

Some easing in demand for warehouse steel is noted, as the holidays approach. Distributors are still being pressed for shapes and plates. They are also moving substantial tonnages of sheets and bars.

Some warehouses report getting deliveries on structural orders placed last August. Inventories of heavier hot-rolled products are down to the point distributors are turning away more tonnage than they book. No early improvement in the supply of structurals, plates and bars is likely.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island (Pittsburgh), Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	*26.00-28.00*

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$30.00-$31.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.06-$1.11 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 95c-$1.00.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for deliver to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
43% no ratio	*33.00-35.00*

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $143; Joliet, Ill., $151; Curtner, Calif., $163.

Steel Output Records Set

November production of ingots and steel for castings totaled 10,249,000 net tons, reports the American Iron & Steel Institute. This set a new record for the month and brought output for the first 11 months of 1955 to 106,534,168 tons, also a record. In November 1954, only 8,089,427 tons were produced.

The month was the third this year in which more than 10 million tons of steel were produced, and it was the fourth in history. The other months were: May and October, 1955, with 10.3 million and 10.5 million tons respectively; and March, 1953, with nearly 10.2 million.

Output in the first 11 months this year exceeded that for any entire year except 1953, when 111.6 million tons were produced. In the first 11 months of last year only 80 million tons were poured.

The index of production for the month was 148.9 compared with 147.6 the preceding month and 117.5 in November a year ago. The index for the first 11 months was 139.

In November, ingot operations averaged 99 per cent of capacity, rated at 125,828,310 tons as of Jan. 1, 1955. In October, the average was 98.2 per cent. Operations averaged 92.5 per cent for the first 11 months, compared with 70.3 per cent in the like period last year when capacity was rated at 124.3 million tons.

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)	Number of weeks in month
1955														
January	8,054,345	86.0	128.7	190,229	49.0	56.7	554,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974	4.43
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233	4.00
March	9,060,026	96.7	141.4	255,493	62.5	72.7	666,235	72.6	186.5	9,981,754	92.4	140.3	2,253,281	4.43
1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139	12.86
April	8,858,549	97.7	142.9	275,089	69.8	80.9	881,477	76.6	197.2	9,815,085	94.8	142.6	2,287,901	4.29
May	9,307,291	99.4	145.3	305,347	75.1	86.9	715,678	77.9	200.4	10,328,316	96.6	145.2	2,331,448	4.43
June	8,764,430	96.6	141.4	283,544	72.0	83.4	698,493	78.6	202.1	9,746,467	94.1	141.6	2,271,904	4.29
2nd Quarter	26,930,270	97.9	143.2	863,960	72.3	83.8	2,095,648	77.7	199.9	29,889,878	95.2	143.1	2,297,454	13.01
1st 6 Months	51,779,525	94.7	138.5	1,515,773	65.8	73.9	3,911,004	72.9	187.5	57,206,302	91.6	137.7	2,211,299	25.87
July	8,232,835	88.1	128.5	288,348	66.1	76.4	600,063	65.5	168.0	9,100,946	85.3	127.9	2,059,038	4.42
August	8,660,612	91.8	134.3	298,972	73.5	85.1	594,000	75.7	194.6	9,594,545	89.7	134.9	2,165,812	4.43
September	8,829,266	97.6	142.4	307,171	78.2	90.3	745,885	84.1	215.8	9,882,325	95.7	143.5	2,308,954	4.28
3rd Quarter	25,662,413	92.4	135.0	874,491	72.6	83.9	2,040,912	75.0	192.5	28,577,816	90.2	135.4	2,176,528	13.13
9 Months	77,441,938	93.9	137.3	2,390,264	66.8	77.2	5,951,916	73.6	189.2	85,784,118	91.1	136.9	2,199,593	39.00
*October	9,369,704	100.0	146.3	330,150	81.2	94.0	801,198	87.3	224.3	10,501,050	98.2	147.6	2,370,440	4.43
†November	9,149,000	100.9	147.6	307,000	77.9	90.3	793,000	89.2	229.4	10,249,000	99.0	148.9	2,389,000	4.29
1954														
January	7,256,526	78.3	113.5	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Quarter	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
May	6,817,951	72.6	105.4	198,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
June	6,702,006	74.7	108.1	207,666	52.7	61.1	453,962	52.8	131.3	7,363,634	72.0	107.0	1,716,465	4.29
2nd Quarter	19,885,283	73.1	105.8	568,386	47.6	55.1	1,353,640	51.9	129.1	21,807,309	70.3	104.4	1,676,196	13.01
1st Half	40,314,689	74.5	107.8	1,210,818	51.0	59.0	2,606,125	50.3	125.0	44,131,632	71.5	106.2	1,705,900	25.87
July	6,040,120	65.3	94.3	205,312	50.6	58.4	382,164	43.1	107.0	6,627,597	62.9	93.2	1,499,456	4.42
August	6,021,496	65.0	94.0	217,837	53.6	62.0	427,574	48.2	119.7	6,666,907	63.1	93.7	1,504,945	4.43
September	6,140,266	68.6	99.1	214,065	54.5	63.0	453,152	52.8	131.1	6,807,483	66.7	98.9	1,590,533	4.28
3rd Quarter	18,201,882	66.3	95.8	637,215	52.9	61.1	1,262,890	48.0	119.1	20,101,987	64.2	95.2	1,530,997	13.13
9 Months	58,516,571	71.7	103.7	1,848,033	51.6	59.7	3,869,015	49.5	123.0	64,233,619	69.1	102.5	1,647,016	39.00
October	6,973,588	75.2	108.9	237,754	58.8	67.7	490,211	55.2	137.3	7,701,533	72.9	108.2	1,738,495	4.43
November	7,307,151	81.4	117.9	231,191	58.7	68.0	551,085	64.1	159.4	8,089,427	79.1	117.5	1,835,647	4.29
December	7,530,204	81.4	117.6	231,126	57.0	65.8	525,743	59.4	147.2	8,287,073	78.6	116.5	1,874,903	4.42
4th Quarter	21,810,923	79.3	114.7	700,071	58.0	67.1	1,567,039	59.5	147.8	24,078,033	76.8	114.0	1,832,423	13.14
2nd Half	40,012,805	72.8	105.2	1,337,286	55.4	64.1	2,829,929	53.8	133.8	44,180,020	70.5	104.6	1,681,767	26.27
Total	80,327,494	73.6	106.5	2,548,104	53.2	61.6	5,436,054	52.0	129.3	88,311,652	71.0	105.4	1,693,741	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

NEW LEVELUME PROCESS INTRODUCED BY H-VW-M

First Nickel Plating Process Combining Full Brightness with "Truly Amazing Leveling" announced by Matawan, N. J. Firm.

Matawan, N. J.—Levelume, a new bright nickel process giving deposits combining "full brightness with truly amazing leveling," was released for general use today by Hanson-Van Winkle-Munning Company, Matawan, N. J., suppliers to the metal finishing industry. Officials of the company stated that the Levelume Process is a milestone—the first nickel process to combine qualities of brightness, high leveling and exceptional speed.

Years of research went into the development of the process, and the result, according to H-VW-M officials, is a process imparting "optimum qualities of brightness, leveling, surface activity, ductility and controlled stress at exceptionally high deposition rates."

The process has already been field tested in several high production automatic conveyors. One leading auto parts producer, it is reported, has increased production well over 100% without investing in new conveyors, enlarging tanks or changing racking methods.

Newly discovered addition agents are the key to the phenomenal success of Levelume. With the new process, plating is done at higher temperatures and higher current densities. Air agitation and continuous filtration through activated carbon prevent contamination build-up that normally leads to deterioration of the deposit's physical properties.

Levelume

READ ABOUT THE NEW PRODUCTION-PROVED H-VW-M NICKEL PROCESS THAT COMBINES BRIGHTNESS AND EXCEPTIONAL LEVELING WITH UNUSUALLY HIGH SPEED

This outstanding, new, high-speed LEVELUME PROCESS has all these advantages—

HIGH BRIGHTNESS—Recessed areas have uniform brightness without shading . . . subsequent deposits are brighter.

EXCEPTIONAL LEVELING — Because of high scratch-filling properties, polishing and buffing can be substantially reduced, sometimes even eliminated. Enormous savings result.

WIDE CURRENT DENSITY RANGE—Can vary from 20-150 asf (normal 60-100 asf). Higher current densities mean faster plating and reduction in equipment, floor space and manpower.

HIGH THROWING POWER—Recesses are covered satisfactorily and good distribution of deposit makes specification conformance possible without piling-up nickel on exposed portions.

CONTROLLER STRESS—No cracking, crazing, lifting or brittleness of deposits.

HIGH DUCTILITY — Comparative tests show good ductility which is maintained even after continued bath use.

EXCELLENT CORROSION PROTECTION—Equal to deposits from other bright or leveling solutions.

VERSATILE—Can be used as single coating or, if higher corrosion protection is desired, a Nickle-Lume top coat can be applied.

EASY SOLUTION CONVERSION TO LEVELUME — With few exceptions other bright nickel baths can be converted.

HIGH SURFACE ACTIVITY—Plated surfaces accept chromium and other deposits without activating treatments. You'll experience none of the ordinary difficulties of other bright nickel processes when you use LEVELUME. One manufacturer reduced chromium plating rejects 12 per cent using Levelume.

— and these advantages, too . . .

- Bath Stable in Operation
- Pleasing White Color Deposits
- Simple Control
- No Objectionable Fumes
- High Tolerance to Impurities
- Low Operating Costs

LEVELUME is already proving its unusual value to enthusiastic users across the country. You can get complete details, and the Levelume Instruction Manual, by writing H-VW-M.

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY

Plants: **Matawan, New Jersey • Grand Rapids, Michigan**

SALES OFFICES: Anderson (Ind.) • Baltimore • Beloit (Wisc.) • Boston Bridgeport • Chicago • Cleveland • Dayton • Detroit • Grand Rapids Los Angeles • Louisville • Matawan • Milwaukee • New York • Philadelphia Pittsburgh • Plainfield • Rochester • St. Louis • San Francisco • Springfield (Mass.) • Utica • Wallingford (Conn.)

H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $94; 19-21% Mn, 1-3% Si, $91.50; 16-19% Mn, $89.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnston, Pa., Philo, O.; Tacoma, Wash.; $205, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 70-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 30.95c per lb of contained Mn, carload packed 31.7c, ton lots 32.8c, less ton 34c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.35c per lb of contained Mn, packed, carload 23.4c, ton lot 25c, less ton 26.2c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 30c; 2000 lb to min carload, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.5c per lb of alloy. Packed, c.l. 12.5c, ton 12.95c, less ton 13.95c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 35.50c, 0.03% max 35c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.8c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95 per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.5c per lb of briquet, c.l. packed, pallets 13.7c, bags 13.5c; 3000 lb to c.l., pallets 13.9; 2000 lb to c.l., bags, 14.7c, less ton 15.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.5c per lb of briquet, c.l. packed, pallets, 13.7c; bags 14.5c, 3000 lb to c.l., pallets, 14.9c; 2000 lb to c.l., bags, 15.8c; less ton 16.6c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

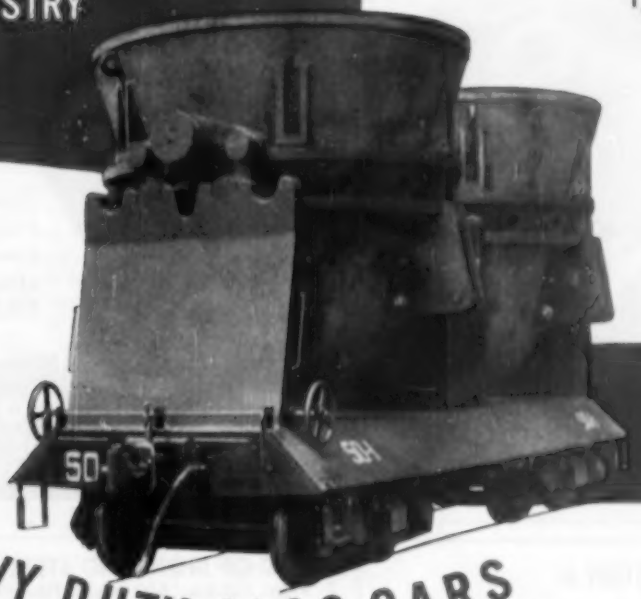
Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

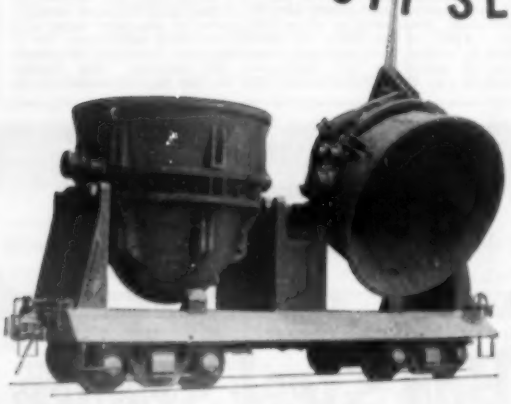
Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

POLLOCK

LEADING CINDER AND SLAG CAR BUILDERS FOR THE IRON AND STEEL INDUSTRY



HEAVY DUTY SLAG CARS



ESPECIALLY DESIGNED FOR TODAY'S OPEN HEARTH OPERATION

● Note the heavier construction used in every detail of this double-pot, crane-dumped car. This extreme ruggedness is a necessity to assure longer life and trouble-free service under present-day big-tonnage production.

In addition to the more sturdy construction, design features contribute to open hearth operational advantages. The unit is unusually compact and permits use with minimum allowances for space clearances. Simplicity of structure reduces maintenance time and retards deterioration. Cradle arrangement permits easier, faster dumping from either side.

Each pot holds 400 cubic feet which provides 800 cubic feet slag disposal capacity within 29'0" coupler to coupler.

Most new open hearth plants have Pollock hot metal and slag handling equipment because Pollock engineering is geared to mesh with overall efficiency planning. Also for open hearth ladles, ingot cars and charging box cars, consult Pollock before you invest.

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Scrap . . .

Scrap Prices, Page 146

Chicago—The upward price rise in scrap was arrested only momentarily several days ago when a large mill announced its buying intentions for several leading steelmaking grades. It appears that this buyer was unable to acquire more than a limited tonnage because brokers were unwilling to accept the prices offered. Since then, the market has jumped another $1 to $3 a ton and on a fairly broad basis. As a result, all-time high prices are being recorded.

New York—Demand for scrap is coming out from all directions and for practically all grades. Brokers have advanced buying prices on all major items in an effort to meet consuming requirements. They are offering $45-$46 for No. 1 heavy melting and No. 1 bundles; $42-$43 for No. 2 heavy melting; $37-$38 for No. 2 bundles; $27-$28 for machine shop turnings; $28-$29 for mixed borings and turnings; and $30-$31 for short shovel turnings.

Buffalo—The local scrap market is firm. Recent price advances brought the list in line with that prevailing at other consuming centers. New business is lacking, but dealers are shipping actively on old orders.

Philadelphia — Scrap prices continue strong with some advances noted. No. 2 bundles are higher at $42, delivered; electric furnace bundles are $52; machine shop turnings and mixed borings and turnings are $36. Low phos structurals and plate have advanced to $53-$54; couplers, springs and wheels, to $55; and rail crops, 2 ft and under, to $63-$64.

Cleveland—Although representative sales were lacking last week, steelmaking and foundry grades of scrap advanced another $1 per ton, reflecting the strong market tone prevailing generally. Foundry scrap, especially railroad material, is especially strong, due to increasing demand and short supply.

Pittsburgh—Scrap prices continue to rise here, largely reflecting the bullish sentiment among steel mill and foundry consumers. High level steel operations are indicated over the next several months, and expectations are that the mills will be active scrap buyers. Quality material is in strong demand, and it is not plentiful.

Boston—An increase of $2 per ton in brokers' buying prices for heavy steel grades is the second in two weeks. It's predicated on covering against export orders. For eastern Pennsylvania, prices paid for No. 2 heavy melting grades are not so high as for shipment to dock.

Cincinnati—The scrap market is firm. Open-hearth grades remain unchanged, with no new buying reported. Foundry items are in active demand. Prices have risen on several. One grade is up as much as $5 per ton over a week ago.

Detroit—Demand for No. 1 grades of steel scrap is heavy. The market displays strength, with No. 1 quoted at $46; No. 1 bundles, $46, No. 2 bundles, $32; and No. 1 busheling, $46. The district ingot rate last week was estimated at 100.5 per cent, compared with 99 the preceding week and 75.5 a year ago.

St. Louis—Scrap demand is strong. Railroad material prices advanced $2 to $4 on the latest list offering. Brake shoes went up $1. No. 1 bundles are quoted higher. Some are going into the Chicago market.

Birmingham—Prices on some railroad scrap items and turnings advanced last week. Open-hearth steel consumers are buying at established prices, but certain brokers predict they will have to pay more for tonnage in view of the continued strong export demand.

(*Please turn to page* 148)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 14	$50.17
Dec. 7	48.83
Nov. Avg.	46.08
Dec. 1954	32.58
Dec. 1950	45.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*49.00-51.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*49.00-51.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*49.00-51.00*
Machine shop turnings	*32.00-33.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*35.00-36.00*
Cut structurals, 3 ft lengths	*53.00-54.00*
Heavy turnings	*43.00-44.00*
Punchings & plate scrap	*53.00-54.00*
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Charging box cast	*43.00-44.00*
Heavy breakable cast	*43.00-44.00*
Unstripped motor blocks	*31.00-32.00*
No. 1 machinery cast	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
Rails, 2 ft and under	*64.00-65.00*
Rails, 18 in. and under	*65.00-66.00*
Rails, random lengths	*60.00-61.00*
Railroad specialties	*58.00-59.00*

Stainless Steel Scrap

18-8 bundles & solids	*335.00-350.00*
18-8 turnings	*220.00-230.00*
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*50.00-51.00*
No. 2 bundles	36.00-37.00
No. 1 busheling	*50.00-51.00*
Machine shop turnings	*26.00-27.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Low phos.	*50.00-51.00*
Cut structural plates 2 ft and under	55.00-56.00
Alloy free, short shovel turnings	*35.00-36.00*
Electric furnace bundles	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Charging box cast	42.00-43.00
Stove plate	*50.00-51.00*
Heavy breakable cast	*41.00-42.00*
Unstripped motor blocks	*33.00-34.00*
Brake shoes	*39.00-40.00*
Clean auto cast	*52.00-53.00*
Burnt cast	*39.00-40.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
R.R. malleable	*59.00-60.00*
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*65.00-66.00*
Cast steel	*57.00-58.00*
Railroad specialties	*60.00-61.00*
Uncut tires	*57.00-58.00*
Angles, splice bars	*65.00-66.00*
Rails, rerolling	*71.00-72.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*335.00-345.00*
18-8 turnings	*195.00-205.00*
430 clips, bundles, solids	*100.00-110.00*
430 turnings	*50.00-60.00*

YOUNGSTOWN

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	52.00-53.00
No. 2 bundles	36.00-37.00
No. 1 busheling	52.00-53.00
Machine shop turnings	29.00-30.00
Short shovel turnings	34.00-35.00
Cast iron borings	29.00-30.00
Low phos.	54.00-55.00
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00

CHICAGO

No. 1 heavy melting	*49.00-52.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 factory bundles	*52.00-53.00*
No. 1 dealer bundles	*48.00-49.00*
No. 2 bundles	*37.00-38.00*
No. 1 busheling	*49.00-52.00*
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*33.00-34.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Cut structurals, 3 ft	*54.00-55.00*
Punchings & plate scrap	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Stove plate	*42.00-43.00*
Unstripped motor blocks	*38.00-39.00*
Clean auto cast	*54.00-55.00*
Drop broken machinery	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
R.R. malleable	*61.00-62.00*
Rails, 2 ft and under	67.00-68.00
Rails, 18 in. and under	68.00-69.00
Angles, splice bars	*65.00-66.00*
Rails, rerolling	73.00-74.00

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*46.00*
No. 2 heavy melting	34.00
No. 1 bundles	*46.00*
No. 2 bundles	*32.00*
No. 1 busheling	*46.00*
Machine shop turnings	22.00
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	53.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	36.00
Stove plate	34.00
Heavy breakable	35.00
Unstripped motor blocks	22.00
Clean auto cast	46.00
Malleable	40.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	38.00-39.00
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Cast iron borings	18.00-19.00
Short shovel turnings	*30.00-31.00*
Machine shop turnings	*29.00-30.00*
Electric furnace bundles	47.00-48.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	50.00-51.00
Structural plate, 2 ft	49.00-50.00
Unstripped motor blocks	*38.00-39.00*
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
Rails, 18-in. and under	*62.00-63.00*
Rails, rerolling	*63.00-64.00*
Rails, random lengths	*57.00-58.00*
Angles, splice bars	*58.00-59.00*

PHILADELPHIA

No. 1 heavy melting	50.00
No. 2 heavy melting	46.00
No. 1 bundles	50.00
No. 2 bundles	*42.00*
No. 1 busheling	50.00
Electric furnace bundles	*52.00*
Machine shop turnings	*36.00*
Mixed borings, turnings	*36.00*
Short shovel turnings	38.00
Heavy turnings	46.00
Structurals, & plate	*53.00-54.00*
Couplers, springs, wheels	*55.00*
Rail crops, 2 ft & under	*63.00-64.00*

Cast Iron Grades

No. 1 cupola	50.50
Malleable	62.50
Heavy breakable cast	52.00
Drop broken machinery	57.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*37.00-38.00*
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	*30.00-31.00*
Low phos. (structural & plate)	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	*45.00-47.00*
Unstripped motor blocks	*28.00-30.00*
Heavy breakable	*44.00-45.00*

Stainless Steel

18-8 sheets, clips, solids	*320.00-325.00*
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*36.50-37.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*34.00-34.50*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.50-24.50
Short shovel turnings	26.00-27.00
No. 1 cast	37.00-37.50
Mixed cupola cast	35.00-35.50
No. 1 machinery cast	40.00-40.50

BUFFALO

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Mixed borings, turnings	30.00-31.00
Machine shop turnings	28.00-29.00
Short shovel turnings	31.00-32.00
Cast iron borings	31.00-32.00
Low phos.	48.00-49.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	55.00-56.00
Rails, 3 ft and under	57.00-58.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	30.00-31.00
Mixed borings, turnings	*28.00-29.00*
Short shovel turnings	32.50-33.50
Cast iron borings	27.50-28.50
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Heavy breakable cast	*44.00-45.00*
Charging box cast	*44.00-45.00*
Drop broken machinery	*54.50-55.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*60.00-61.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	41.50
No. 2 heavy melting	39.00
No. 1 bundles	*43.00*
No. 2 bundles	35.00
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	*41.00*
Clean auto cast	47.00
Stove plate	40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00*
Rails, 18 in. and under	65.50
Rails, random lengths	*61.50*
Rails, rerolling	*60.00*
Angles, splice bars	*61.50*

SEATTLE

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	40.00
No. 2 bundles	34.00
No. 3 bundles	25.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	*33.00*
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	35.00
Brake shoes	35.00

Railroad Scrap

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	**39.00**
No. 2 heavy melting	**37.00**
No. 1 bundles	**39.00**
No. 2 bundles	**35.00**
Machine shop turnings	**12.00**

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	**43.00-45.00**

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

No. 1 heavy melting	*43.50*
No. 2 heavy melting	*39.50*
No. 1 bundles	*43.50*
No. 2 bundles	*36.00*
Mixed steel scrap	*36.00*
Mixed borings, turnings	17.00
Rails, remelting	*52.50*
Busheling, new factory: Prepared	*41.50*
Unprepared	*37.50*
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b. shipping point.

(*Concluded from page 145*)

Los Angeles—District scrap dealers report their 1955 volume was at least 15 per cent greater than that in 1954. Few new accounts were picked up during the year, but old consumers' needs were substantially larger.

San Francisco—Steel scrap is moving steadily into consuming channels. One district mill, charging 90 per cent scrap, is operating at 106 per cent of rated capacity.

Seattle — Scrap receipts continue heavy despite adverse weather conditions east of the Rockies. Domestic consumption is above normal; and exports are active. Japan is hungry for scrap, but she is not buying actively, possibly in the hope of forcing down prices.

Pig Iron . . .

Pig Iron Prices, Page 133

The pig iron melt will decline this week and will be down sharply next week as foundries suspend operations for the holidays. Some will suspend for year-end inventory taking, but it is believed suspensions will not be so general as in some previous years.

Business is expected to snap back rapidly after the turn of the year. Demand for pig iron is strong, due in part to buying for inventories.

Merchant iron supply so far has been adequate to match shipping requirements.

Iron Ore . . .

Iron Ore Prices, Page 140

Shipments of Lake Superior iron ore in the navigation season just concluded totaled 87,459,853 gross tons, reports the Lake Superior Iron Ore Association. This was an increase of 26,666,156 gross tons over the 60,793,697 tons moved in the 1954 shipping season. In only two previous years were shipments greater—1953 (95,844,449 tons) and 1951 (89,092,012 tons).

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 140

Coke production totaled 6,631,120 net tons in October, according to the U. S. Bureau of Mines. Output consisted of 6,453,386 tons of oven coke and 177,734 tons of beehive. Total output was up 3.7 per cent from the preceding month.

Output in the first ten months this year was 61,748,110 tons, of which 60,460,043 tons were oven coke and 1,288,067 beehive. In the like period of 1954, output totaled 48,792,500 tons —48,274,300 oven coke and 518,200 beehive.

Producers' stocks of oven coke at the end of October totaled 1,781,185 tons, equal to 8.6 days production, but off 9.8 per cent from the end of the preceding month. At the end of October in 1954, stocks amounted to 2,850,695 tons, equal to 17.5 days of production.

Foundry coke shipments are at peak, with the indications a solid first quarter is pretty well assured. Ovens are being operated at capacity in the Chicago area to accommodate the strong order volume.

Refractories . . .

Refractories Prices, Page 140

Construction of a basic refractory brick plant at Columbiana, O., is being pushed by Kaiser Aluminum & Chemical Corp. Contracts for erection of the $4-million plant have been awarded, and it is expected to be ready for operation by early next summer.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

800 tons, municipal power plant, 74th St., New York, to Lehigh Structural Steel Co., Allentown, Pa.

450 tons, Montana state Missouri river bridge, to unstated interest.

450 tons, Boehm Junior High School, Falls Township, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

425 tons, school, Mackworth Island, Falmouth, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Consolidated Constructors Inc., Portland, Me., general contractor; 36 tons, reinforcing bars, to same shop.

325 tons, building, Supplee-Wills-Jones Milk Co., Camden, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

300 tons, Montana state Yellowstone river bridge, to unstated interest.

250 tons, Montana state Big Horn river bridge, to unstated interest.

150 tons, regional high school, Acton-Roxboro, Mass., to Groisser & Shiager Iron Works, Somerville, Mass.; J. F. Rand & Son Co., Boston, general contractor; reinforcing bars, Northern Steel Inc., Medford, Mass.

150 tons, manufacturing plant, Shawinigan Resins Corp., Indian Orchard, Mass., to New England Iron Works, New Haven, Conn.; Wigton-Abbott Corp., Plainfield, N. J., general contractor.

100 tons, shapes and bars, school, Barnstable, Mass., to John E. Cox Co., Fall River, Mass., and Joseph T. Ryerson & Son Inc., Boston; Charles H. Cunningham Co., West Yarmouth, Mass., general contractor.

STRUCTURAL STEEL PENDING

4000 tons, 8-place B-52 hangar, Larson Air Base, Moses Lake, Wash.; also storage tanks; bids to Boeing Airplane Co., Seattle, postponed to Jan. 17.

2657 tons, state bridge, Westmoreland county, Pa., bids Dec. 29; also, 479 tons of reinforcing bars.

760 tons, state bridge, York county, Pa.; H. J. Williams, York, Pa., is general contractor.

600 tons, four 150-ft through truss spans, four 28-ft rolled beam spans; also nuts, bolts, etc., Alaska railroad bridge; bids to General Services Administration, Seattle, Dec. 19.

530 tons, 4-story branch for the First National Bank, Portland, Oreg.; general contract to C. M. Corkum Co., Portland.

500 tons, municipal filter plant, Philadelphia; bids Dec. 20.

320 tons, state bridge, Vine St., Philadelphia; bids Dec. 16.

140 tons, state bridge, Berks county, Pa.; bids Dec. 29.

MANUFACTURING CAPACITY OPEN

We have open time for the following operations:

1—Sheet Fabrication
2—Tube Fabrication
3—Metal Stampings
4—Cloth Cutting & Sewing
5—Degreasing—Painting—Baking

This is a low overhead plant which can mean savings for you.

KUMMETH MANUFACTURING CO.
Box 455
OWATONNA, MINNESOTA

FOR SALE

SURPLUS STEEL STRIP IN COILS

2592 pounds ½" ±.0032 x 0.0075 ±.00025 Sandvik No. 17 Vibrator Reed Steel, SAE 1095, Rockwell 15-N 83/84 per Spec. SS-0001. Round edge precision rolled, in coils approx. 20" ID x 24" max. OD.

4400 pounds 0.937" ±.062 x 0.020" ±.005, SAE 1080, Rockwell C 30/34, mill edge precision rolled, in coils approx. 12" ID x 45" OD.

No reasonable offer will be refused. Inquire Purchasing Department.

FANSTEEL METALLURGICAL CORP.
North Chicago, Illinois

LARGE MACHINE AND WELDMENT CAPACITY

Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

C. H. WHEELER MANUFACTURING CO.
Sedgley Ave., at 19th & Lehigh
Philadelphia 32, Pa.
Phone: Henry Kingston—Sagamore 2-6500

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

CLASSIFIED

Help Wanted

EXCELLENT OPPORTUNITY

For young man willing to assume responsibility. Should be familiar with production problems and have experience in handling men. Experience in tube production and cold drawing preferred. Give full particulars—qualifications, experience and present salary. Reply Box 348, STEEL, Penton Building, Cleveland 13, Ohio.

DRAFTSMAN—CHECKER
STRUCTURAL STEEL DETAILER

Fine opportunity to obtain a permanent position with a growing medium-size firm. Due to expansion, opportunity to advance is excellent. Location: Medium-size Central California city where the climate is good and living is pleasant. Starting Salary—$525 a month. Man must have minimum 5 years' experience in structural steel fabricating plant; better than average capacity to grow; stability; good references. Reply Box 354, STEEL, Penton Building, Cleveland 13, Ohio.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered: present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

OXYGEN-NITROGEN-ARGON
GENERAL MANAGER

Industrial Gas Division of leading producer of oxygen, nitrogen, argon generators.

This rapidly expanding newcomer in the field of industrial gas production and sales now operates in five locations. Each location is integrated with a manager, operating and sales staff; backed up with the most modern American made columns for the production of pure oxygen, nitrogen, and argon. Also acetylene, helium, and special industrial and medical mixtures. The company has the largest source of pure hydrogen on the East Coast. The General Manager will report to the Vice President and have complete charge of existing divisions plus new divisions which are being planned.

Applicants should now be a Division Manager in the Industrial Gas Field who desires to progress into the broader responsibility of managing an entire multiplant operation. Must have a thorough understanding of the field combined with strong sales and management ability to promote growth in a competitive industry

OTHER POSITIONS OPEN

Sales Engineers for high level contacts with steel and metallurgical industries.

Sales Personnel who are interested in a career in industrial gases, and welding and cutting apparatus sales leading to division manager goal.

Design Engineers for gas welding and cutting apparatus.

APPLY IN CONFIDENCE TO B. H. VAN DYKE
AIR PRODUCTS, INC.
P. O. Box 538
ALLENTOWN, PENNSYLVANIA

WANTED

1—18" or 20" Roll Turning Lathe, to turn 2 rolls from single or double drive.

1—18" or 20" Roll Turning Lathe, to turn rolls single.

ROTARY ELECTRIC STEEL CO.
Box 4606
Detroit 34, Michigan

OVERHEAD TRAVELING CRANE DESIGN ENGINEER

Graduate engineer with substantial experience in design, construction and executive responsibility wanted to take charge of engineering department in overhead crane and hoist manufacturing plant. Mail resume of professional and executive experience, salary requirements, etc., to

Box 349, STEEL
Penton Building
Cleveland 13, Ohio

DIRECTOR OF ENGINEERING

Consumer Metal Products

$30,000

Exceptional opportunity to direct large engineering organization in well-established, nationally-known manufacturing company located in desirable city. Annual sales exceed $150,000,000.

This man should now be between 40 and 50 years of age and should have administered a sizeable engineering staff in the metal products field. Executive experience more important than specific product exposure.

Your reply which may be brief, should include age and present position. It will be treated confidentially.

Reply Box 355, STEEL
Penton Building Cleveland 13, Ohio

FOUNDRY RESEARCH METALLURGIST

EXPERIENCED IN BASIC ELECTRIC AND OPEN HEARTH PRACTICE, CARBON AND LOW ALLOY STEELS. POSITION PERMANENT AND NOW OPEN. GIVE COMPLETE INFORMATION IN FIRST LETTER. MUST FURNISH ACCEPTABLE REFERENCES.

INFORMATION WILL BE HELD IN STRICT CONFIDENCE BY A SINGLE EXECUTIVE.

REPLY BOX 352, *STEEL*

PENTON BUILDING **CLEVELAND 13, OHIO**

115 tons, bridge, including steel bearing piles, Amherst, Mass.

REINFORCING BARS . . .

REINFORCING BARS PLACED

108 tons, Snoqualmie, Wash., high school and drydocking notch, Puget Sound Navy Yard, to Bethlehem Pacific Coast Steel Corp., Seattle.

100 tons, science building, University of Connecticut, Storrs, Conn., to Scherer Steel Co., Hartford, Conn.; Anderson Fairoaks Construction Co., Hartford, general contractor.

REINFORCING BARS PENDING

7000 tons, also 250 tons of precast concrete pipe, Wahluke siphon project near Othello, Wash.; bids to Bureau of Reclamation, Denver, to be invited about Dec. 20.

479 tons, state bridge, Westmoreland county, Pa.; bids Dec. 29; also 2657 tons of structurals.

290 tons, public school, Fisher and Porter streets, Philadelphia.

265 tons, three state bridges, Fall River-Boston expressway, Brockton-Avon-Stoughton, Mass.; bids Dec. 20, Boston.

200 tons, three underpasses, Boeing Airplane plant No. 2, Seattle; Howard S. Wright Co. Inc., Seattle, is low at $353,000.

192 tons, Roza power plant, Yakima project; Hall-Atwater Co., Seattle, is low at $572,763 to the Bureau of Reclamation.

124 tons, two schedules, Olympic National Park project; A. M. Halvorson Inc., Portland, Oreg., is low at $292,612 to the Bureau of Public Roads, Portland, Oreg.

PLATES . . .

PLATES PENDING

2000 tons, plate steel, 3-mile Wahluke, Washington state project; bids to Denver invited about Dec. 20.

1300 tons, liner plates for Wahluke project, Washington state; bids to Denver about Dec. 20.

950 tons, bulk fuel storage tanks, King Salmon, Alaska; general contract to Macri Construction Co., Anchorage, Alaska, low at $1,001,043; bids opened Sept. 26.

250 tons, underground fuel storage tanks, naval station, New Orleans; bids Dec. 28 to the Eighth Naval District, New Orleans.

PIPE . . .

CAST IRON PIPE PLACED

80 tons, system expansion, 6 to 10 in., Grants Pass, Oreg., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

400 tons, various dimensions; bids to Medford, Oreg., Dec. 14.

76 tons, system improvement; bids to Wenatchee, Wash., Dec. 12.

65 tons, King county District No. 49, Seattle; bids Dec. 16.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian National, 2625 freight cars, with 700 fifty-ton boxcars and 100 seventy-ton gondolas going to Eastern Car Co. Ltd., 900 fifty-ton boxcars and 100 fifty-ton flatcars to the Canadian Car & Foundry Co., 400 fifty-ton boxcars, 200 fifty-ton and 25 thirty-ton refrigerator cars to the Canadian Steel Car Co. and 200 seventy-ton covered hoppers to Marine Industries.

Central of Georgia, 545 freight cars, with 500 fifty-ton boxcars going to Pullman-Standard Car Mfg. Co., Chicago, and 25 covered hoppers and 20 depressed center flatcars to its own shops in Macon, Ga.

Kansas City Southern, 50 flatcars, through Piggy-Back Inc., to Pullman-Standard Car Mfg. Co., Chicago.

Pacific Fruit Express, 1800 standard refrigerator cars and 200 mechanically refrigerated cars, to own shops.

Seaboard Airline, 1000 freight cars, with 500 seventy-ton coal hoppers going to Pullman-Standard Car Mfg. Co., Chicago, 300 seventy-ton phosphate cars to Bethlehem Steel Co., Bethlehem, Pa., and 200 high-side gondolas to Magor Car Corp., New York.

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LIGHTen Your Cost-Load Switch to AMERICAN PHILLIPS SCREWS

for Assured Savings on Any Assembly

Just the simple job of putting protective covers on your switch-plates is enough to prove the basic Phillips savings . . . which can be multiplied in your plant's production departments.

First, you get automatically straight driving . . . with no fumbling, wobbling, or dropping of screws. And what you *don't get* are any scarred work-surfaces or injured workers. All of which adds up to as much as 50% time-savings over out-dated methods . . . *and plainly proves that Phillips Screws always cost least to use.*

Now add the special advantages of *American* Phillips Screws . . . an always dependable supply from one of the screw industry's top-production plants . . . unlimited range of standard *and special* Phillips fasteners . . . acknowledged engineering leadership based on know-how plus follow-through . . . and you can clearly light your own way to making your assembly operations more productive and less costly than with any other fastening method. Write.

X marks the spot . . .
the mark of extra quality

AMERICAN SCREW CO.

PHILLIPS HEADquarters
WILLIMANTIC, CONNECTICUT

Plants at Willimantic, Conn. and at Norristown, Pa.
Warehouse and office at Chicago
Office, Detroit, Michigan

ANOTHER *expansion* FOR AETNA-STANDARD

● Aetna-Standard's fourth major expansion in 15 years expands production capacity by 40%.

The expansion increases machining, welding and assembly facilities with more floor space and new machine tools. A new power plant moves the KVA load from 300 to 750 KVA capacity.

The continued demand for steel, copper, brass, aluminum, rubber and plastic requires more and more production machinery, such as Aetna-Standard designs and manufactures. Capacity to produce more equipment is a responsibility of the machinery manufacturer who depends upon these basic industries for his orders.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES ● CONTINUOUS ELECTROLYTIC TINNING LINES ● SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT ● CONTINUOUS BUTT WELD PIPE MILLS ● SEAMLESS TUBE MILLS ● DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT ● ROLLS AND CASTINGS ● EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

How to cut machining time on hard, tough parts like these

A STEEL can be hard and tough without needing to be hard and tough *to machine.* If you need such a steel for slitter knives, machine tool parts, pump parts, or other parts where wear resistance and strength are important, get Timken 52100 steel.

Its fully spheroidizing structure makes 52100 easy to machine. And without sacrificing strength or hardenability!

This high-carbon analysis alloy steel has high fatigue and tensile strength as well as good hardenability throughout its cross section. Timken 52100 steel will withstand working pressures up to 200,000 p.s.i., and can be oil quenched to a maximum hardness of 65/66 Rockwell C. in normal sections.

Rigid quality control at every step in production is your assurance of uniform quality in every shipment. The Timken Company pioneered the production of 52100. We are one of the world's largest producers of 52100 and the *only* source of 52100 steel in three finished forms—bars, tubes and wires. And for small run or emergency requirements, the Timken Company maintains a mill stock of 101 sizes of 52100 tubing, ranging from 1" to 10½" O.D.

For a stock list of available sizes, grades and finishes, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING